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A PRELIMINARY LOOK AT AVE-SESAME IV CONDUCTED ON
9 - 10 MAY 1979

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November 1980



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16. ABSTRACT This report contains information on data collected, synoptic conditions, and severe and unusual weather reported during the AVE-SESAME IV period. The information is preliminary. The purpose of the report is to provide to researchers a preliminary look at conditions during the AVE-SESAME IV period.			
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A PRELIMINARY LOOK AT AVE-SESAME IV CONDUCTED

ON 9-10 MAY 1979

1. OBJECTIVES AND SCOPE

The objectives of AVE-SESAME (Atmospheric Variability Experiment-Severe Environmental Storms and Mesoscale Experiment) are to provide a data base for studying mesosynoptic atmospheric structure and variability associated with convection and severe weather. Rawinsonde sounding data were obtained at 3-hr intervals to investigate spatial and temporal changes of mesosynoptic conditions associated with the formation, development, and maintenance of convective activity, and the interaction between convective activity and its immediate environment.

This preliminary report contains information and analysis of the general weather conditions during the AVE-SESAME IV period. Synoptic charts, radar maps, satellite photographs, rainfall amounts, and a summary of severe weather reports assembled from the NOAA weather wire and the national weather summaries are compiled for 1200 GMT 9 May through 1200 GMT 10 May 1979. The purpose of this report is to provide to researchers a preliminary look at conditions during the AVE-SESAME IV period. Additional information for AVE-SESAME IV has been presented by Alberty et al. (1979).

2. DATA COLLECTED

a. Rawinsonde Soundings

Rawinsonde soundings were collected at 23 National Weather Service stations and at 20 special stations in Texas and Oklahoma. A list of these stations is given in Table 1, and their locations are shown in Figures 1 and 2.

Table 1. Rawinsonde stations participating in the AVE-SESAME IV experiment.

Station Number	Location
<u>NWS Stations</u>	
229 (CKL)	Centerville, AL
232 (BVE)	Boothville, LA
235 (JAN)	Jackson, MS
240 (LCH)	Lake Charles, LA
217 (GGG)	Longview, TX
255 (VCT)	Victoria, TX
260 (SEP)	Stephenville, TX
261 (DRT)	Del Rio, TX
265 (MAF)	Midland, TX
270 (ELP)	El Paso, TX
327 (BNA)	Nashville, TN
340 (LIT)	Little Rock, AR
349 (UMN)	Monet, MO
354 (OKC)	Oklahoma City, OK
363 (AMA)	Amarillo, TX
365 (ABQ)	Albuquerque, NM
433 (SLO)	Salem, IL
451 (DDC)	Dodge City, KS
456 (TOP)	Topeka, KS
469 (DEN)	Denver, CO
532 (PIA)	Peoria, IL
553 (OMA)	Omaha, NE
562 (LBF)	North Platte, NE
<u>Special Stations</u>	
20 (ADA)	Ada, OK
21 (LTS)	Altus, OK
22 (CAN)	Canadian, TX
23 (CHE)	Cheyenne, OK
24 (CHK)	Chickasha, OK
25 (CDS)	Childress, TX
26 (CSM)	Clinton Sherman, OK
27 (EMC)	Elmore City, OK
28 (FSI)	Ft. Sill, OK
29 (GAG)	Gage, OK
30 (HEA)	Healdton, OK
31 (HEN)	Hennessey, OK
32 (HNT)	Hinton, OK
33 (TVY)	KTVY, OKC
34 (MTV)	Mountain View, OK
35 (OUN)	Norman, OK
36 (SEL)	Seiling, OK
37 (SHM)	Shamrock, TX
38 (SUD)	Stroud, OK
39 (SPS)	Wichita Falls, TX

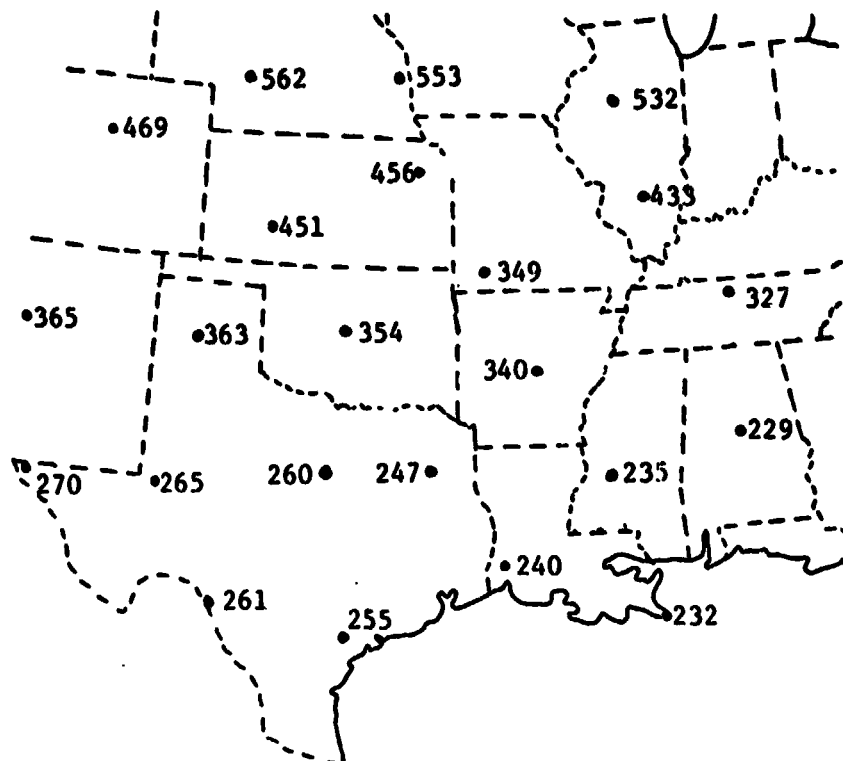


Fig. 1. Locations of the 23 NWS rawinsonde stations participating in the AVE-SESAME IV experiment.

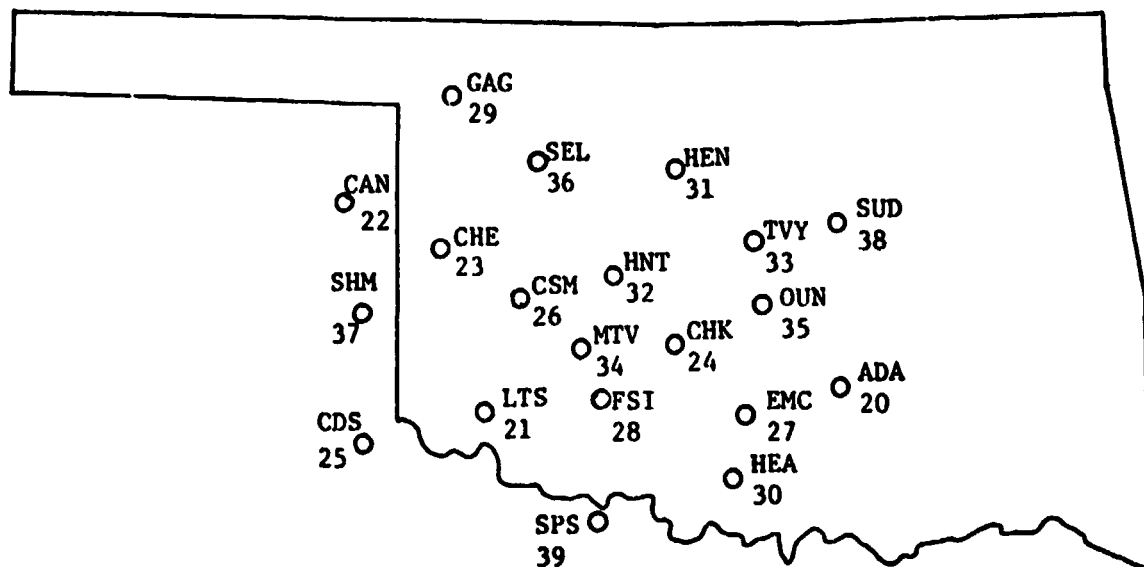


Fig. 2. Locations of the 20 special rawinsonde stations participating in the AVE-SESAME IV experiment.

The dates and times of scheduled soundings are as follows:

<u>Date</u>	<u>Time (GMT)</u>
9 May 1979	12, 15, 18, 21
10 May 1979	00, 03, 06, 09, 12

Sounding data interpolated to 25-mb intervals will be presented in a separate document. These data may be obtained in hard copy form or on magnetic tape from the Atmospheric Sciences Division (Code: ES84), Space Sciences Laboratory, NASA, Marshall Space Flight Center, Alabama 35812.

b. Surface and Upper Air

Surface and upper air charts and data are available from the National Climatic Center in Asheville, North Carolina.

3. SYNOPTIC CONDITIONS

a. Synoptic Charts

Surface and upper air charts for the AVE-SESAME IV period are presented in Figures 3-7. Surface charts are presented at 6-hr intervals and upper air charts at 12-hr intervals. These charts were plotted and analyzed using National Weather Service data and show the general conditions during the experiment. They should not be used for other purposes.

At 1200 GMT 9 May 1979 a surface low pressure center was located over southeastern New Mexico. A stationary front extended northeastward from the low into the lower Great Lakes region, and a cold front extended southwestward into Mexico.

Two strong jet maxima having wind speeds in excess of 120 kt propagated northeastward from the axis of an upper level trough located over the mountains of northern Utah. The first jet maxima is apparent at 300 mb at 1200 GMT 9 May 1979 over central Colorado. Within the next twelve hours the core of this jet moved north of the AVE-SESAME IV network. The second

jet was evident at 300 mb at 0000 GMT 10 May 1979 over western New Mexico and southeastern Arizona. The latter jet maxima moved east-northeastward into the Texas Panhandle area by 1200 GMT 10 May and diminished in intensity.

A low-level jet with maximum winds near 35 kt transported the warm and moist air from southeastern Texas toward the front and northward to southern Minnesota. The advection of this air contributed to potential instability in the area of convective activity.

By 1800 GMT 9 May 1979, a dry line developed in western Texas ahead of the front. Convective activity began to form in that area near 0400 GMT 10 May as the stationary front became a cold front and intersected the dry line. Echo tops of these storms reached 50K ft.

The severe weather in the Texas Panhandle occurred after 2100 GMT 9 May 1979 with echo tops at about 45K ft. The Amarillo sounding indicated the tropopause to be near 41K ft. By this time surface temperatures were in the upper 80's and lower 90's from western Texas to western Oklahoma. Mixing ratios dropped dramatically just ahead of the front from western Texas to the Texas Panhandle.

By 2200 GMT 9 May 1979, a tornado watch had been issued for the northeastern part of the Texas Panhandle area through western Oklahoma and into south-central Kansas. Echo tops reached 65K ft just ahead of the stationary front in this region. Shortly after 2300 GMT 9 May tornadic activity began in the southern end of the watch box.

Wind directions at 300 mb indicated diffluence over Colorado and western Kansas at 0000 GMT 10 May. The diffluence was observed just to the west of the initial development of the storms in central Kansas.

At 0600 GMT 10 May 1979 the stationary front became a cold front from southern Kansas southwestward into Mexico. As the 300 mb trough moved to

the northeast, the storms began to diminish, and by 1200 GMT 10 May echo tops were under 40K ft throughout most of the AVE-SESAME IV area.

Most stations measuring rainfall of one inch or more were in eastern Nebraska or to the north of the AVE-SESAME IV network. However, locally heavy rainfall fell in the Texas Panhandle and extreme western Oklahoma areas.

b. Radar

Selected radar summary charts are presented in Figures 8-24 for the AVE-SESAME IV period. They show areas of convective activity, heights of echoes, movement vectors, severe weather watch boxes, etc.

c. Satellite

Satellite photographs were taken at 15-min intervals during the AVE-SESAME IV period. Selected visual and infrared satellite photographs for each hour during the period are presented in Figures 25-47.

d. Rainfall

Isohyets of accumulated rainfall during the AVE-SESAME IV operational period are presented in Figure 48. Special or cooperative climatological station data were not used in the analysis.

4. UNUSUAL AND SEVERE WEATHER REPORTED

Reports of tornadoes, severe thunderstorms, hail, high winds, and severe weather watches and warnings were compiled for AVE-SESAME IV from the NOAA weather wire and national weather summaries and are presented in Table 2. Locations of observed tornadoes, observed funnel clouds, radar-indicated tornadoes, hail, and thunderstorms are shown in Figure 49. The severe weather outbreak during AVE-SESAME IV was confined to the northeastern quadrant of the Texas Panhandle and the northwestern part of Oklahoma. A total of six tornadoes and at least three funnel clouds were

observed in these two areas as well as the majority of the severe thunderstorm and hail reports between 2130 GMT 9 May and 0430 GMT 10 May 1979. Two tornadoes and three funnel clouds were sighted just west of Canadian, Texas, within a span of three hours. The damage though was minimal. Golf-ball size hail fell near Gage, Oklahoma, and smaller hail was reported nearby. Heavy rains were confined to northwestern Oklahoma and the extreme northeastern part of the Texas Panhandle in association with the highest echo tops. In less than a twenty-four hour period, Gage received nearly four inches of rain.

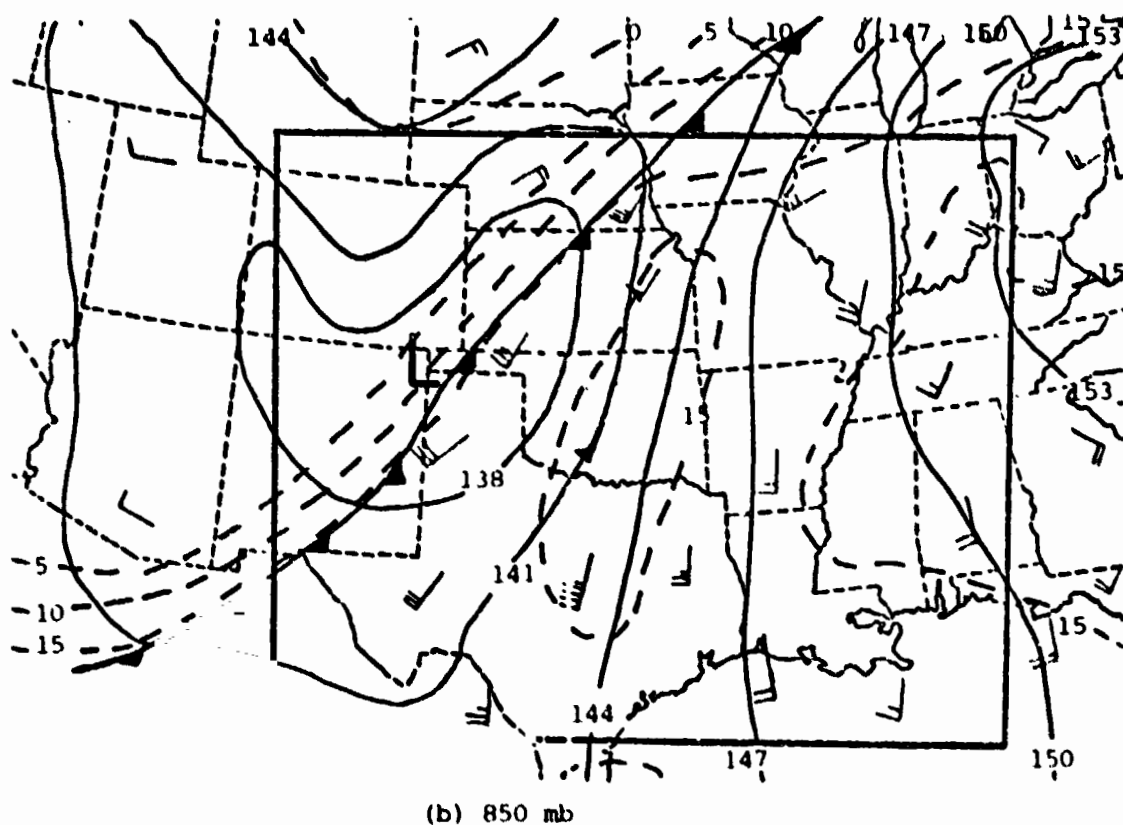
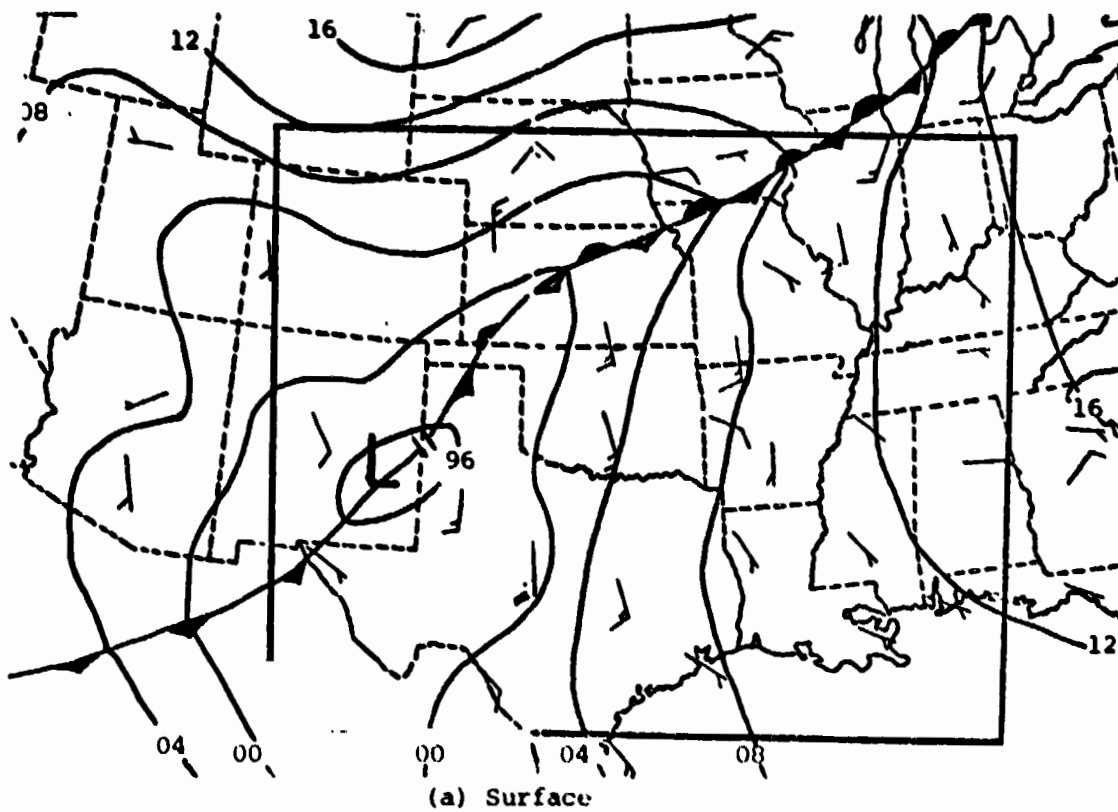
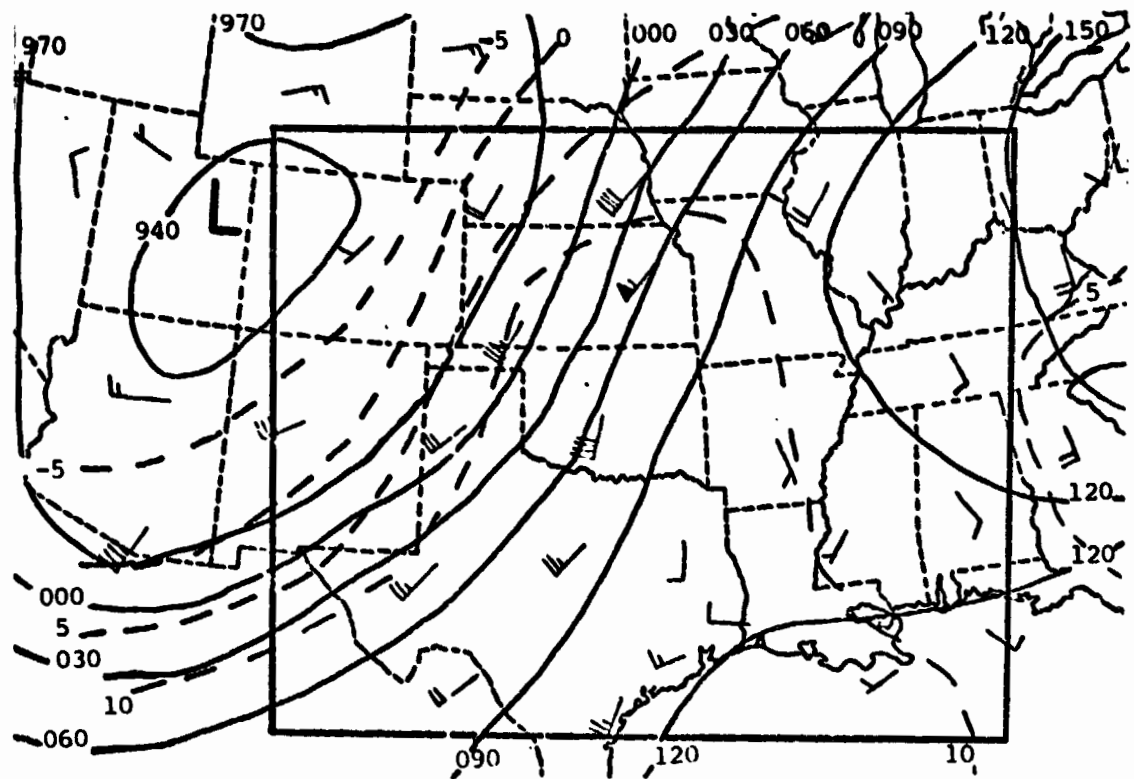
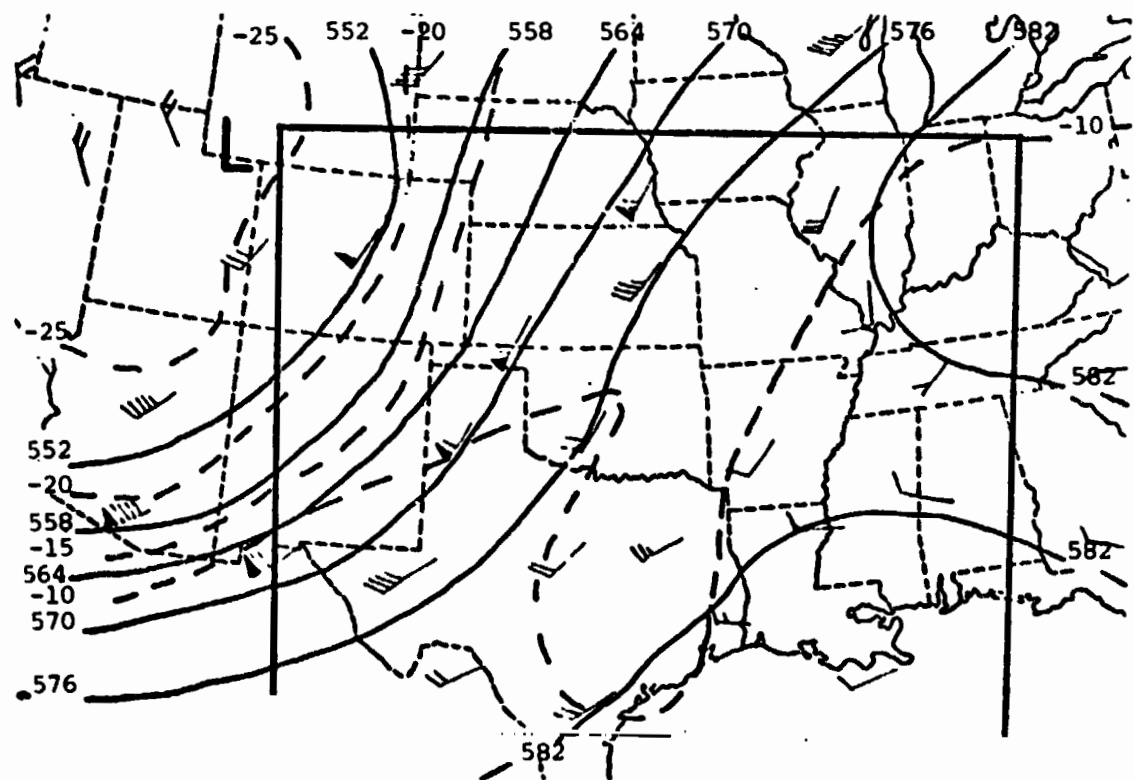


Fig. 3. Synoptic charts for 1200 GMT 9 May 1979.

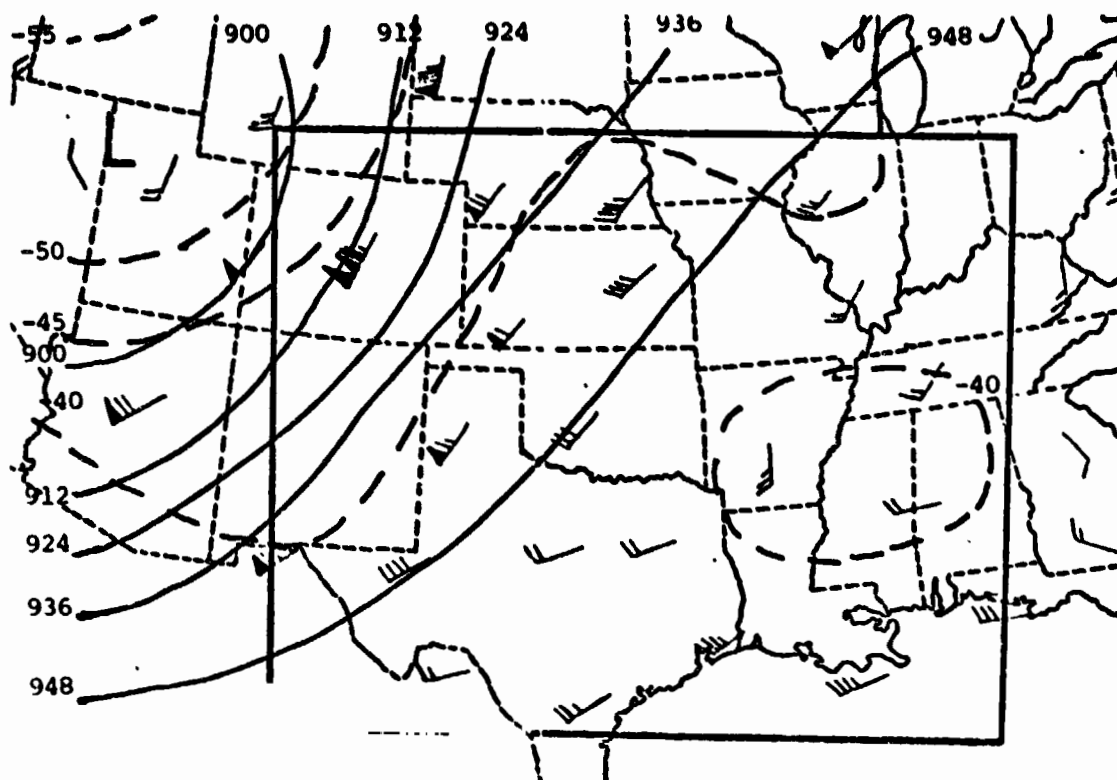


(c) 700 mb

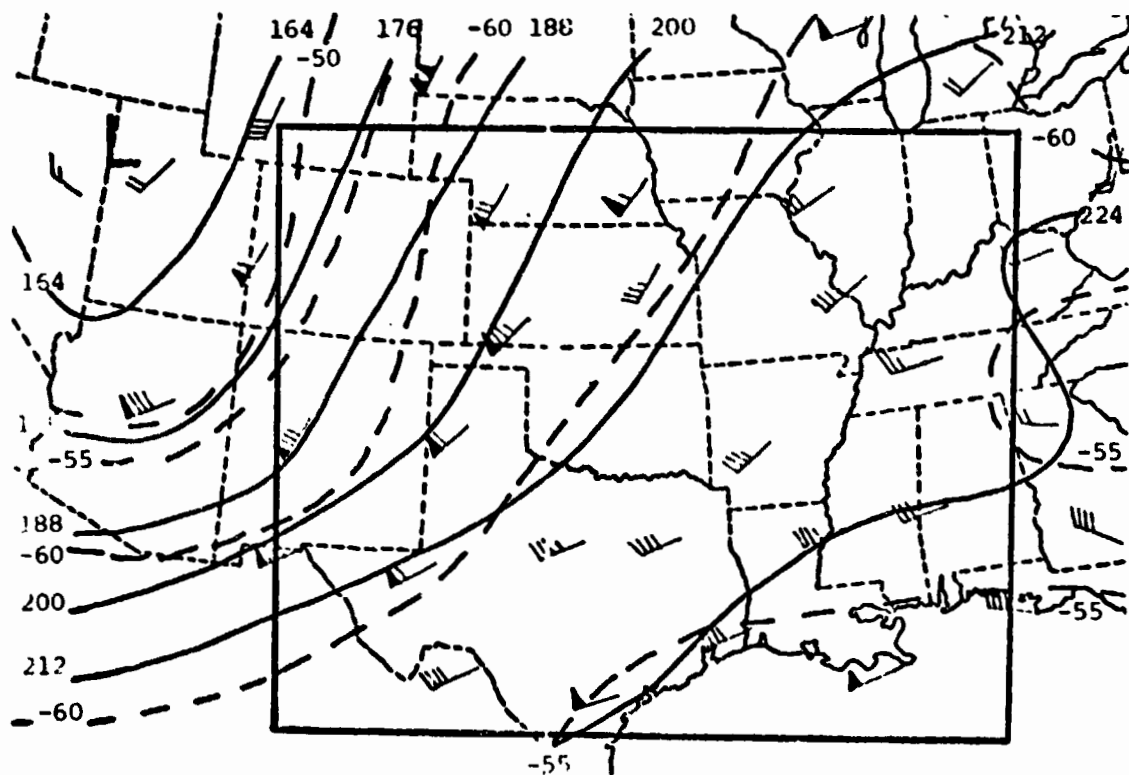


(d) 500 mb

Fig. 3. Continued.



(e) 300 mb



(f) 200 mb

Fig. 3. Concluded.

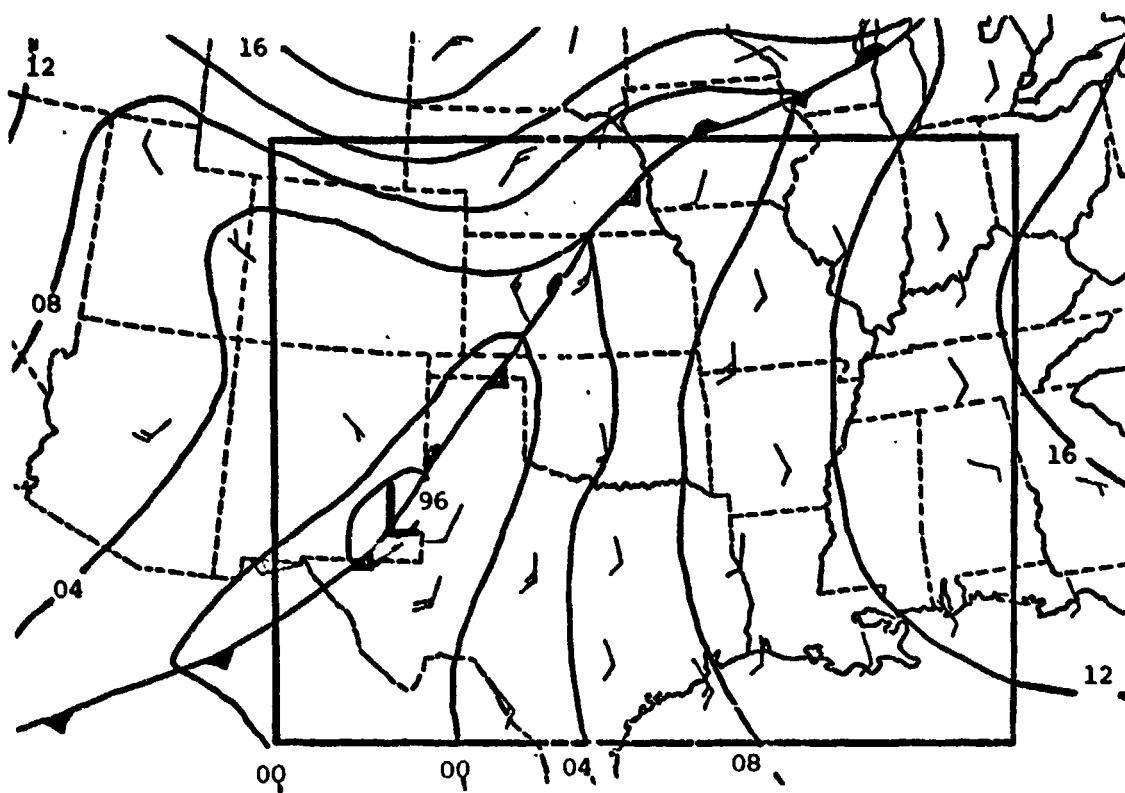
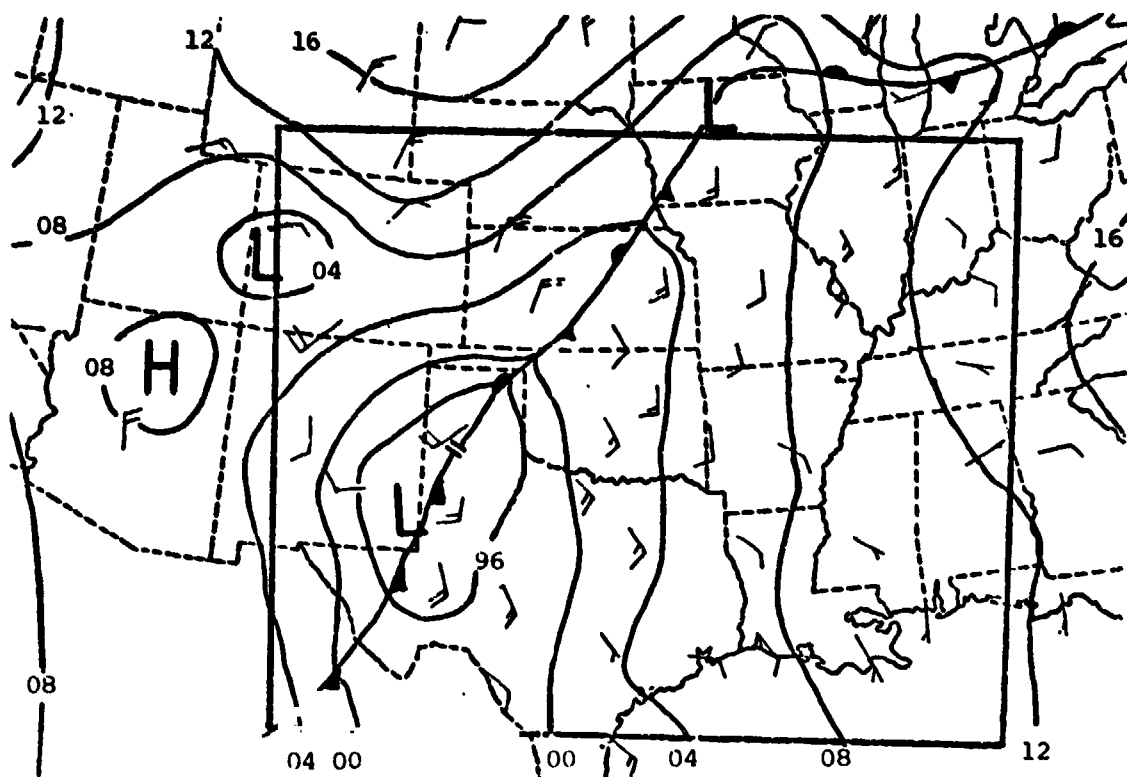
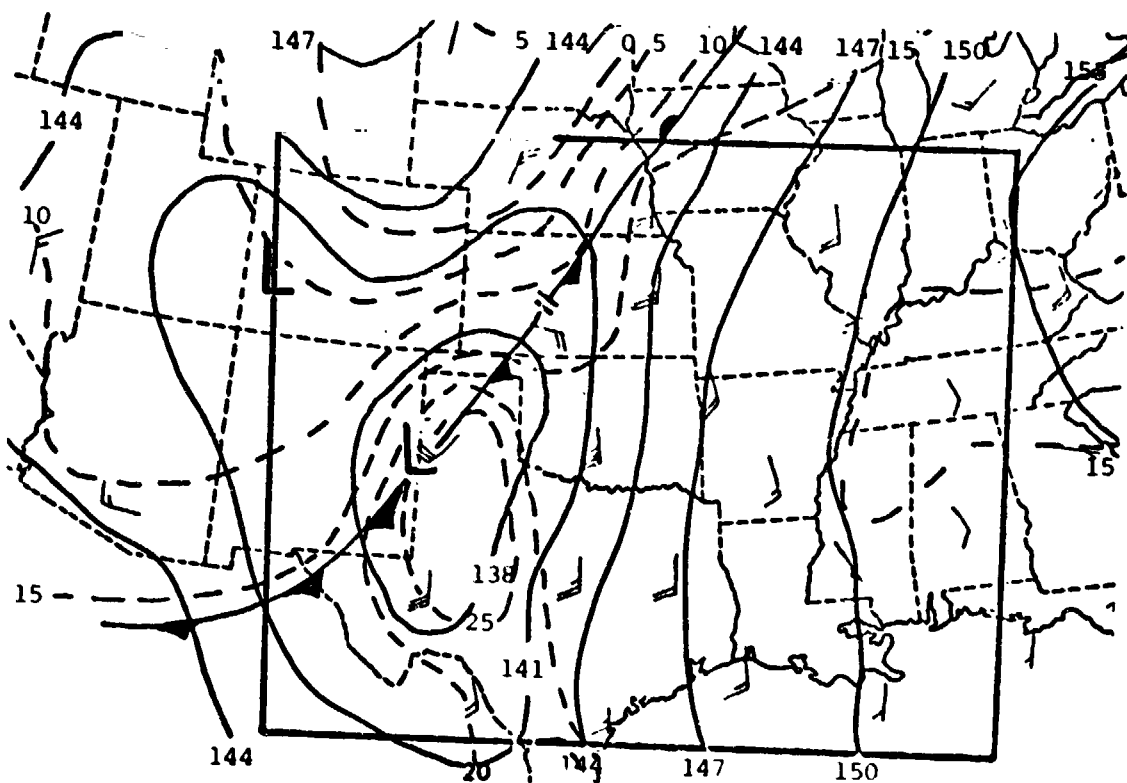


Fig. 4. Surface chart for 1800 GMT 9 May 1979.

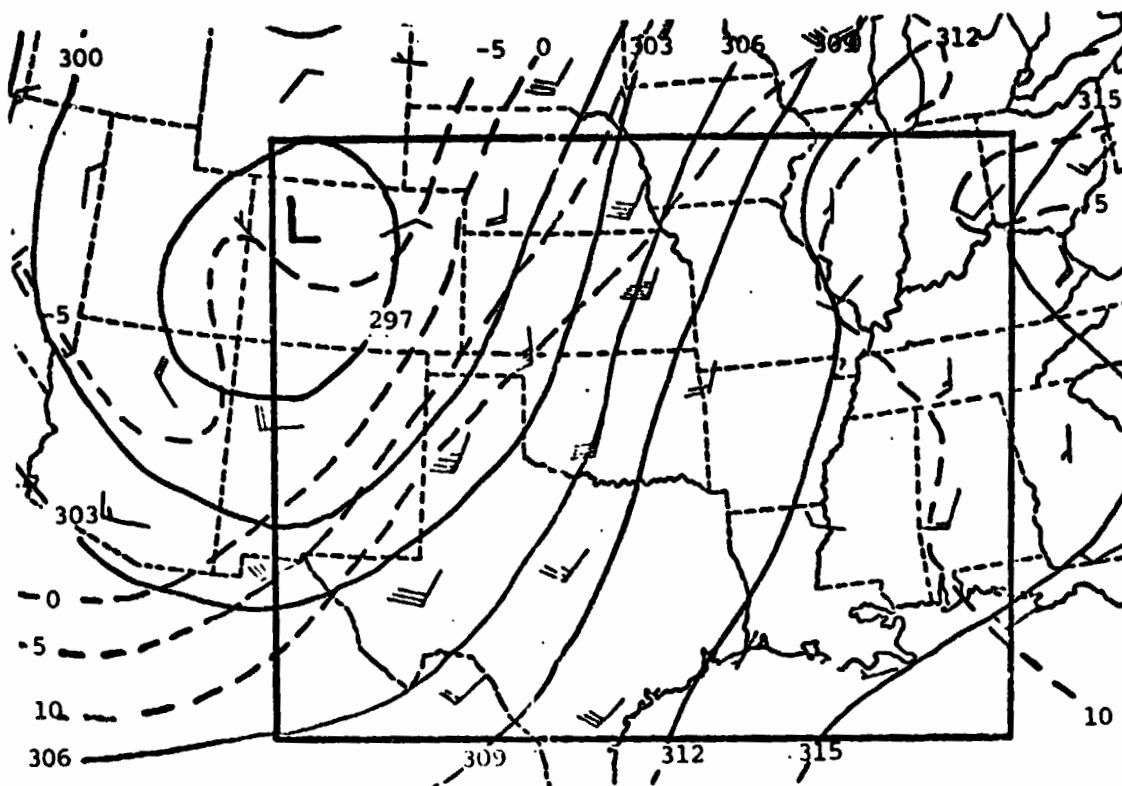


(a) Surface

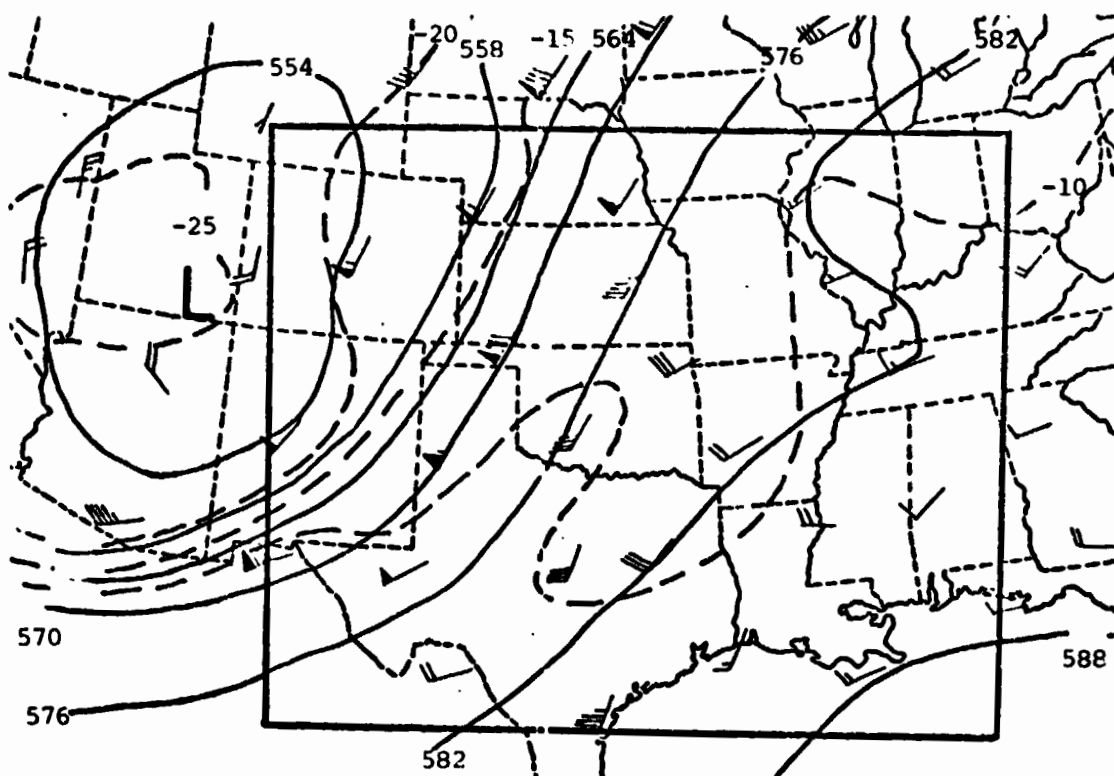


(b) 850 mb

Fig. 5. Synoptic charts for 0000 GMT 10 May 1979.

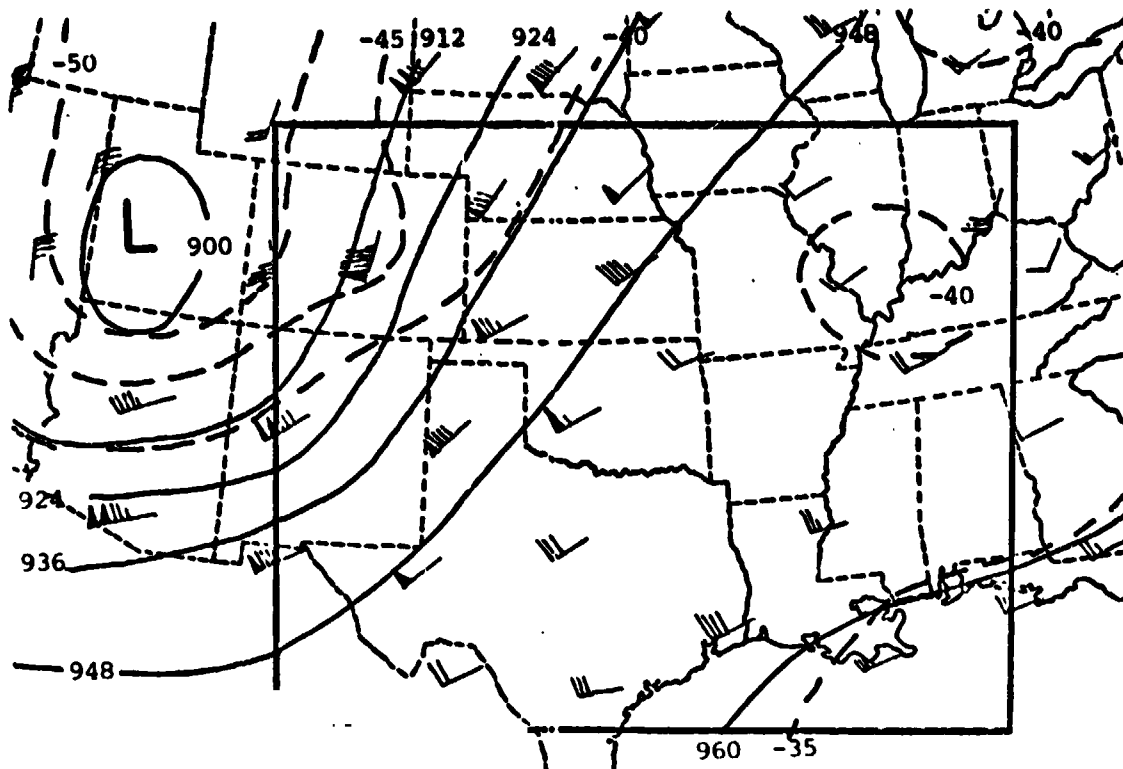


(c) 700 mb

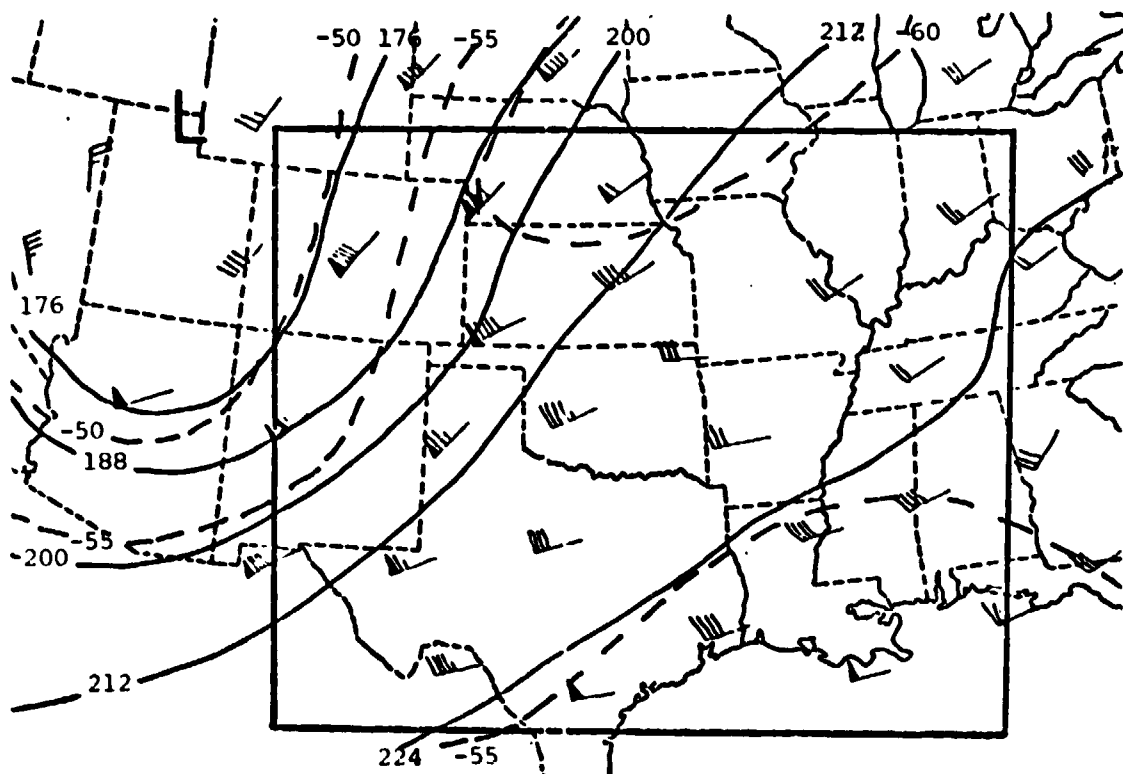


(d) 500 mb

Fig. 5. Continued.



(e) 300 mb



(f) 200 mb

Fig. 5. Concluded.

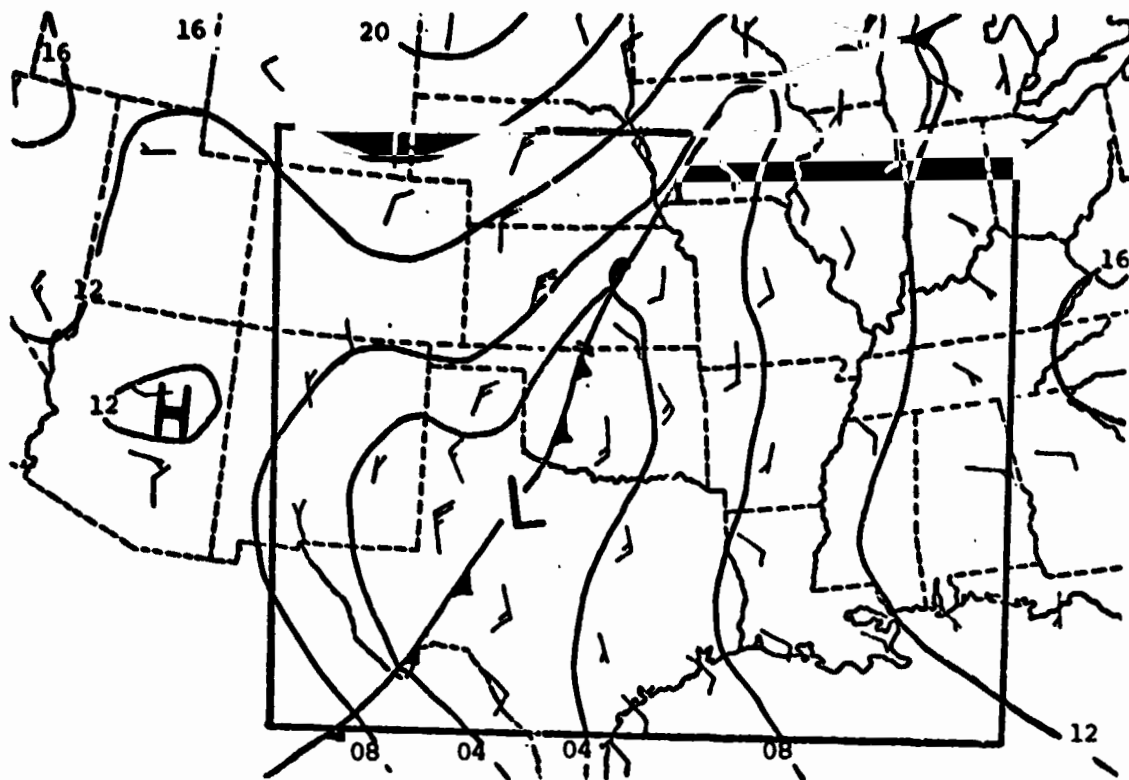
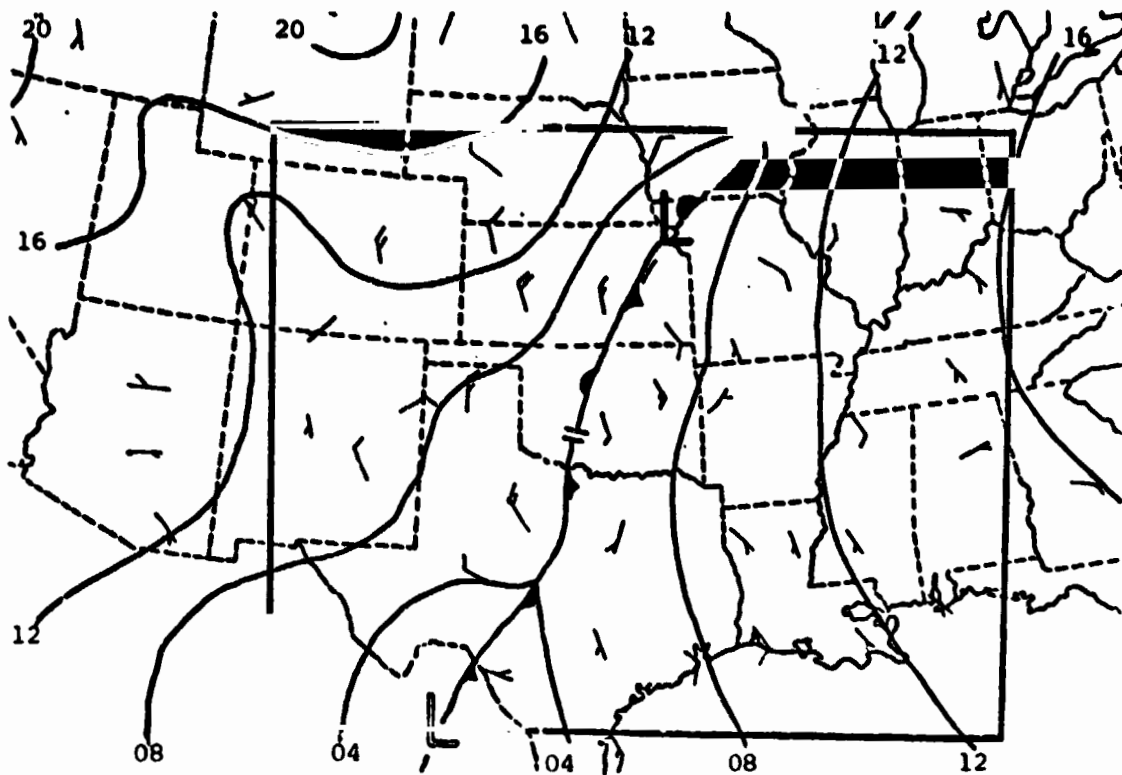
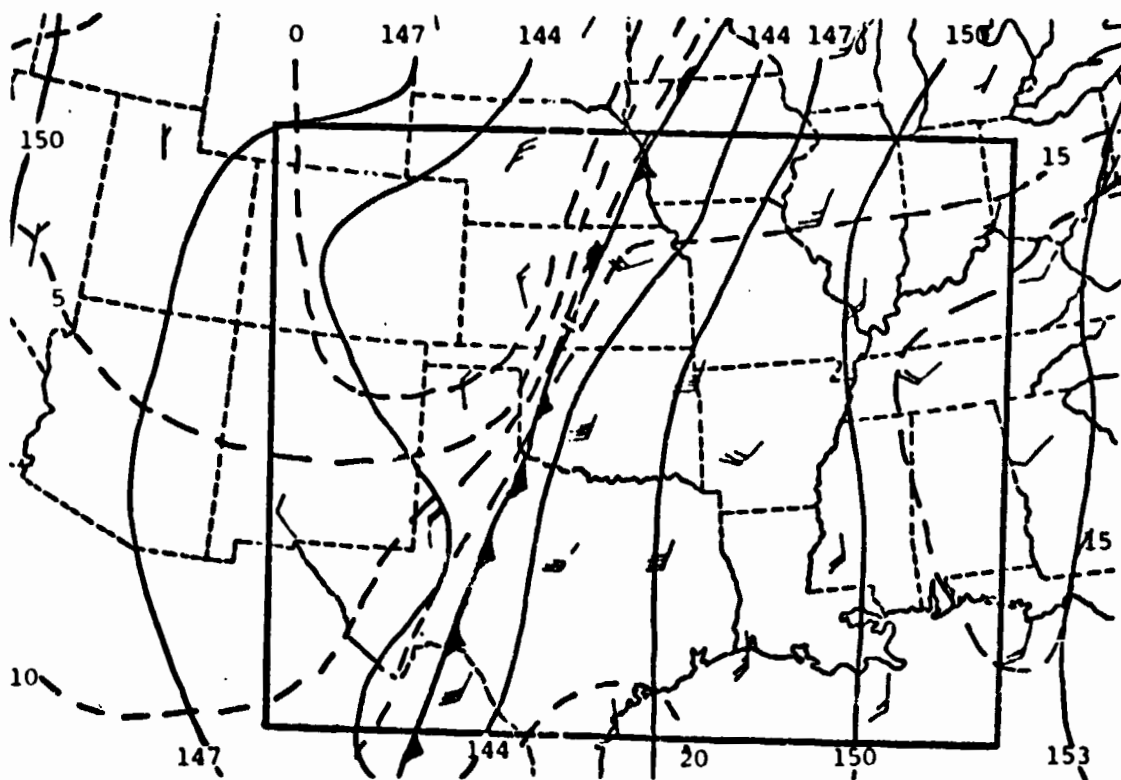


Fig. 6. Surface chart for 0600 GMT 10 May 1979.

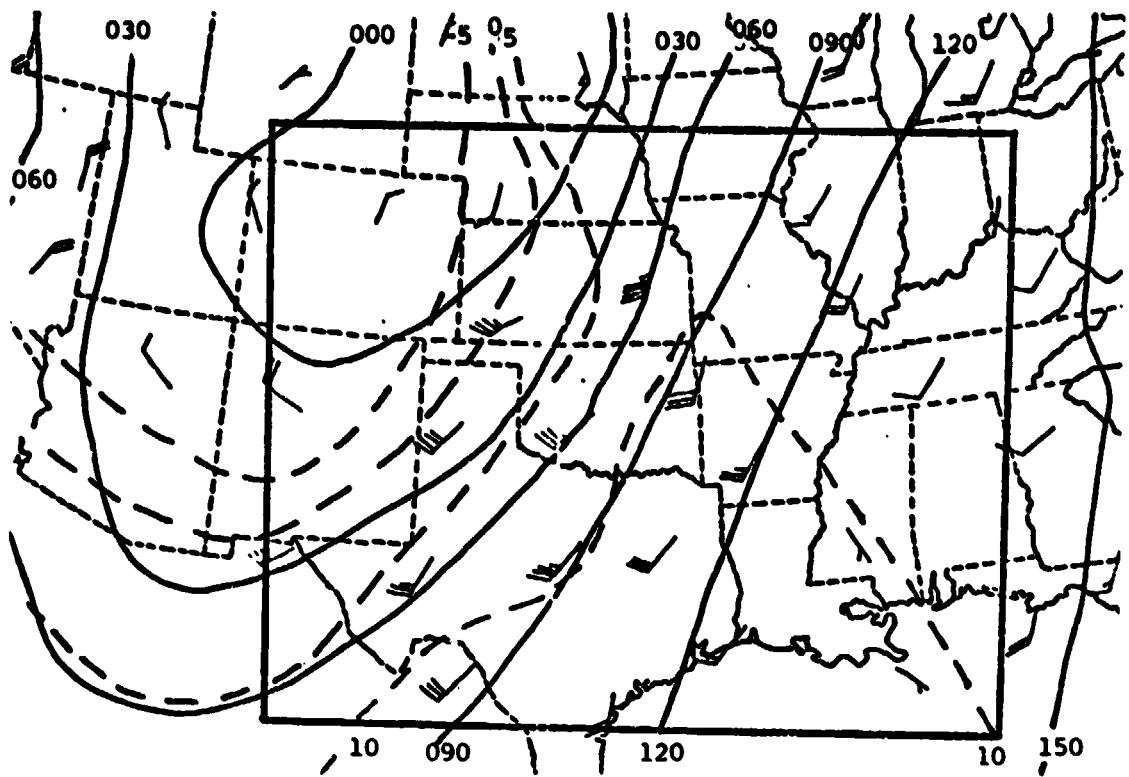


(a) Surface

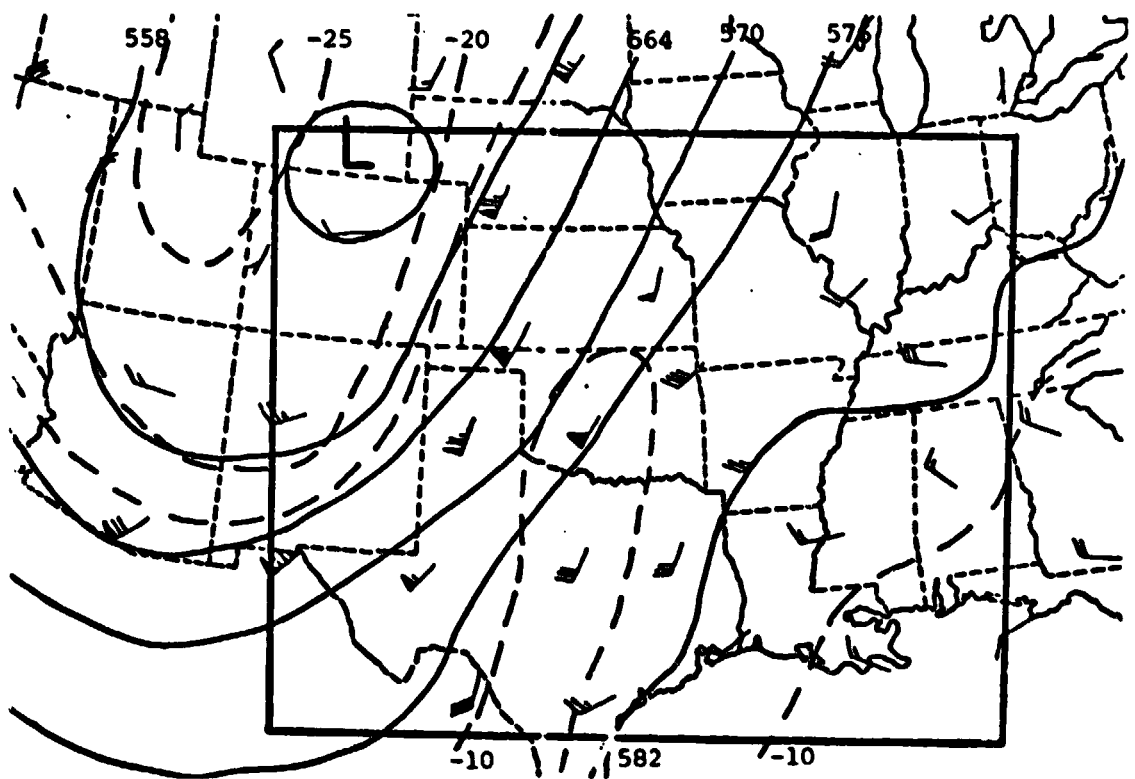


(b) 850 mb

Fig. 7. Synoptic charts for 1200 GMT 10 May 1979.

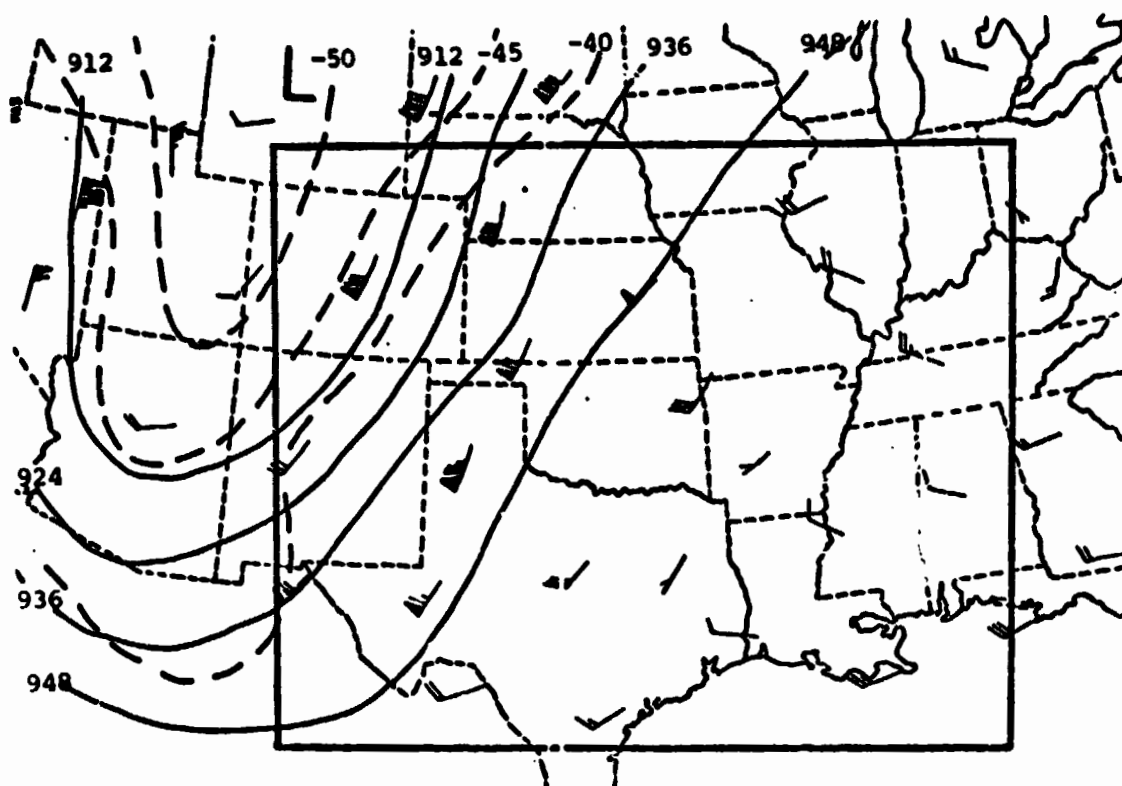


(c) 700 mb

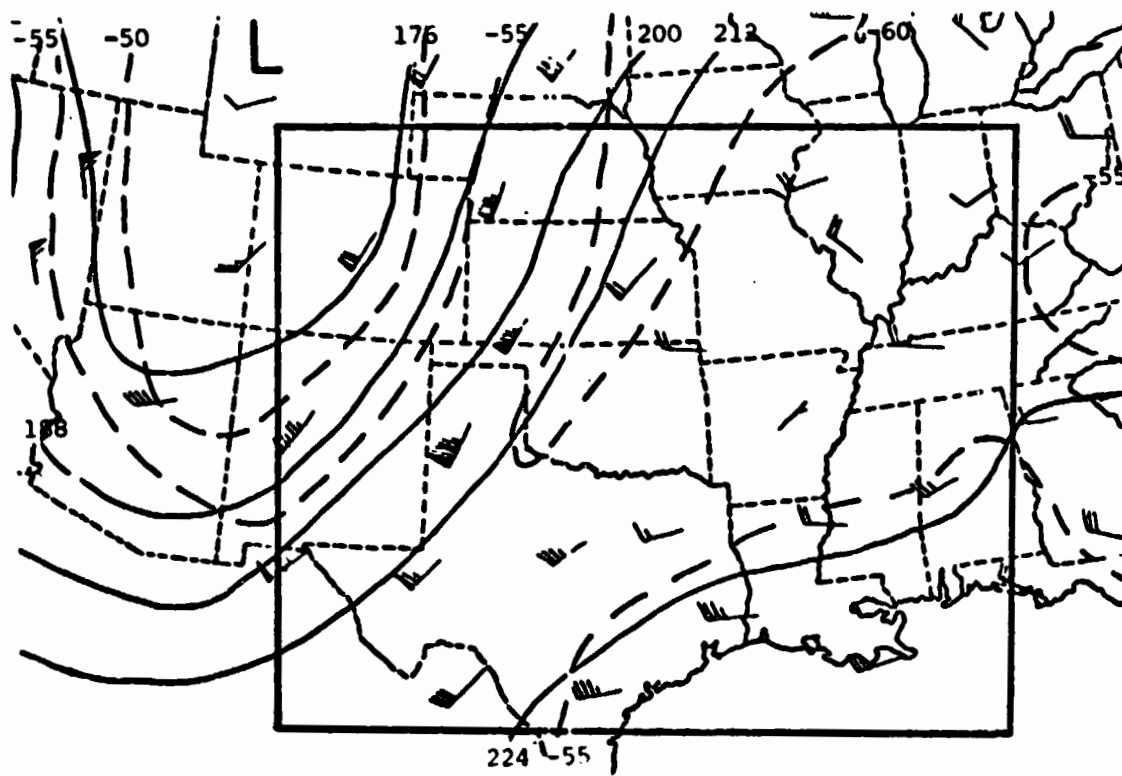


(d) 500 mb

Fig. 7. Continued.



(e) 300 mb



(f) 200 mb

Fig. 7. Concluded.

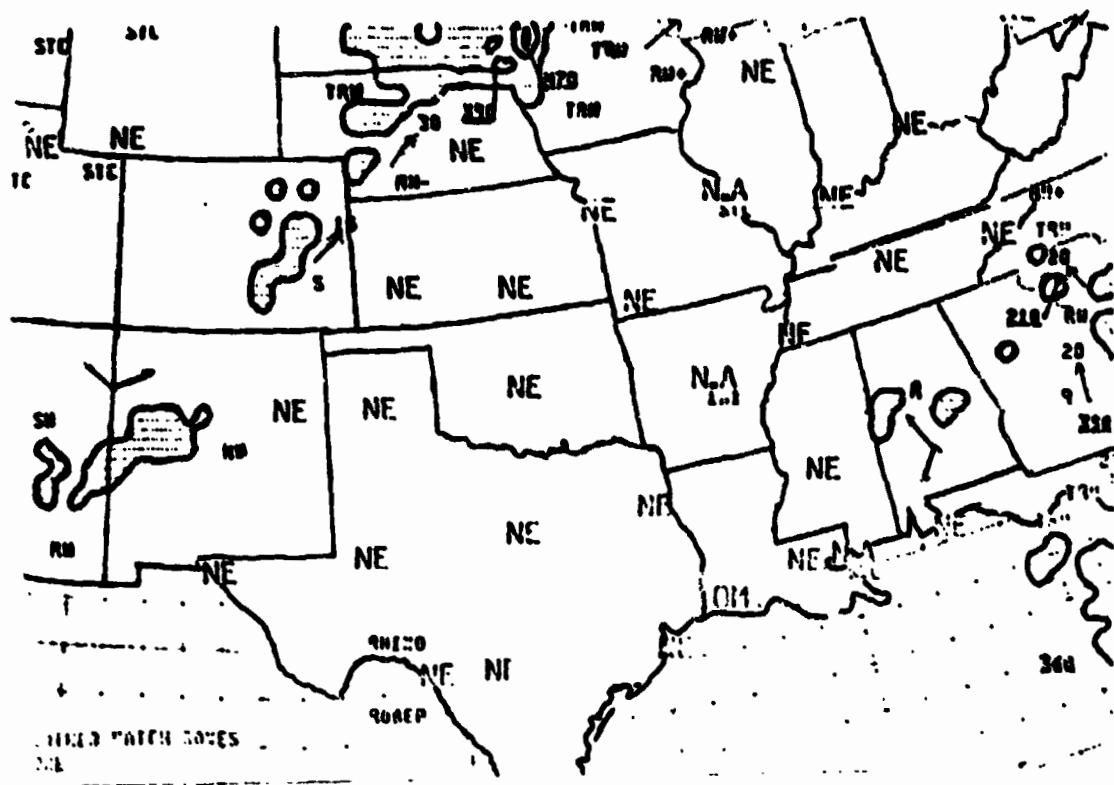


Fig. 8. Radar summary for 1135 GMT 9 May 1979.

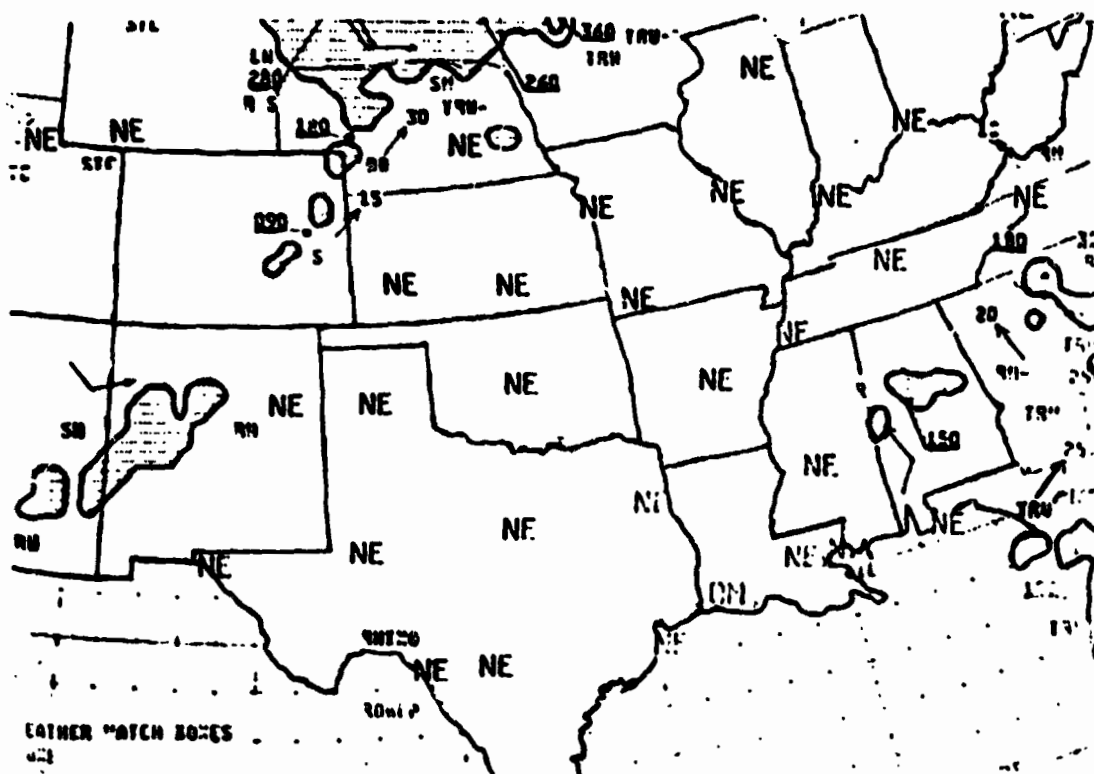


Fig. 9. Radar summary for 1235 GMT 9 May 1979.

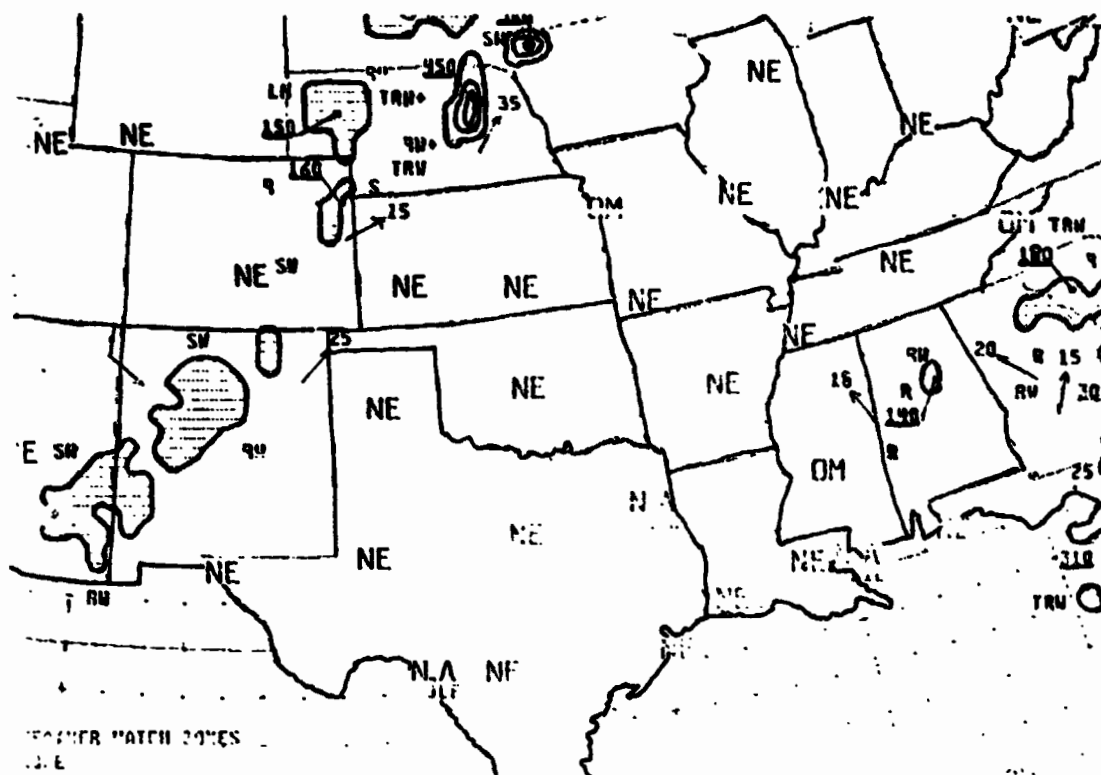


Fig. 10. Radar summary for 1435 GMT 9 May 1979.

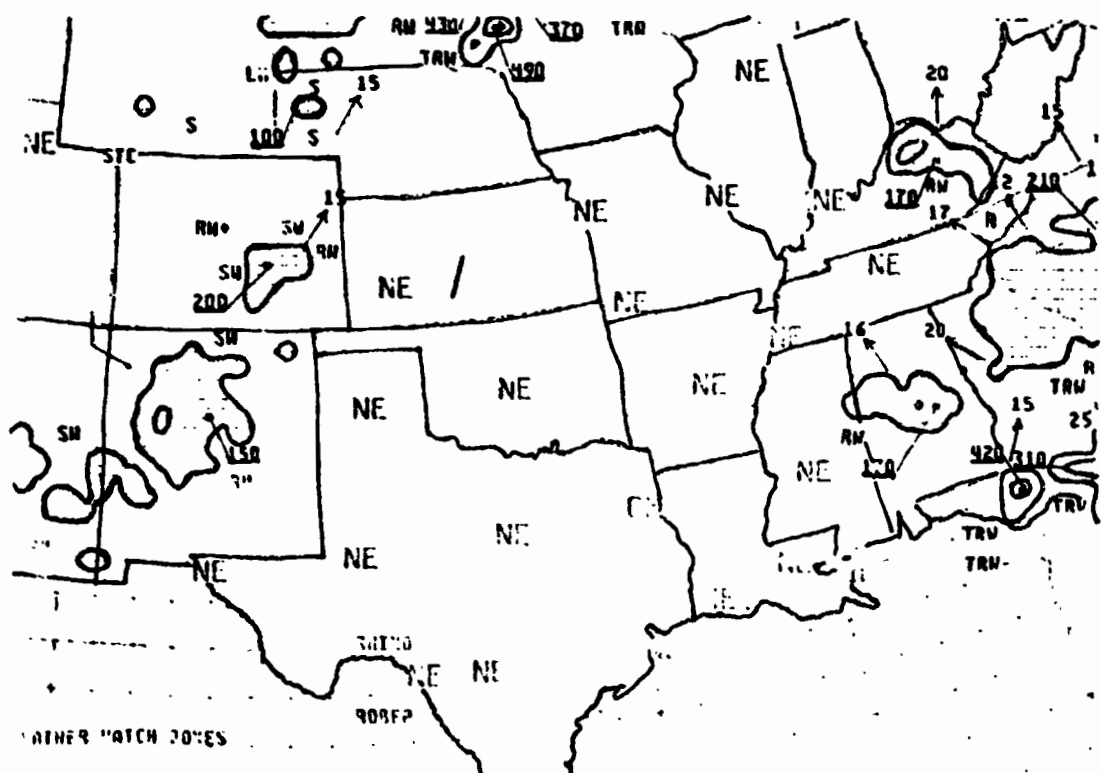


Fig. 11. Radar summary for 1735 GMT 9 May 1979.

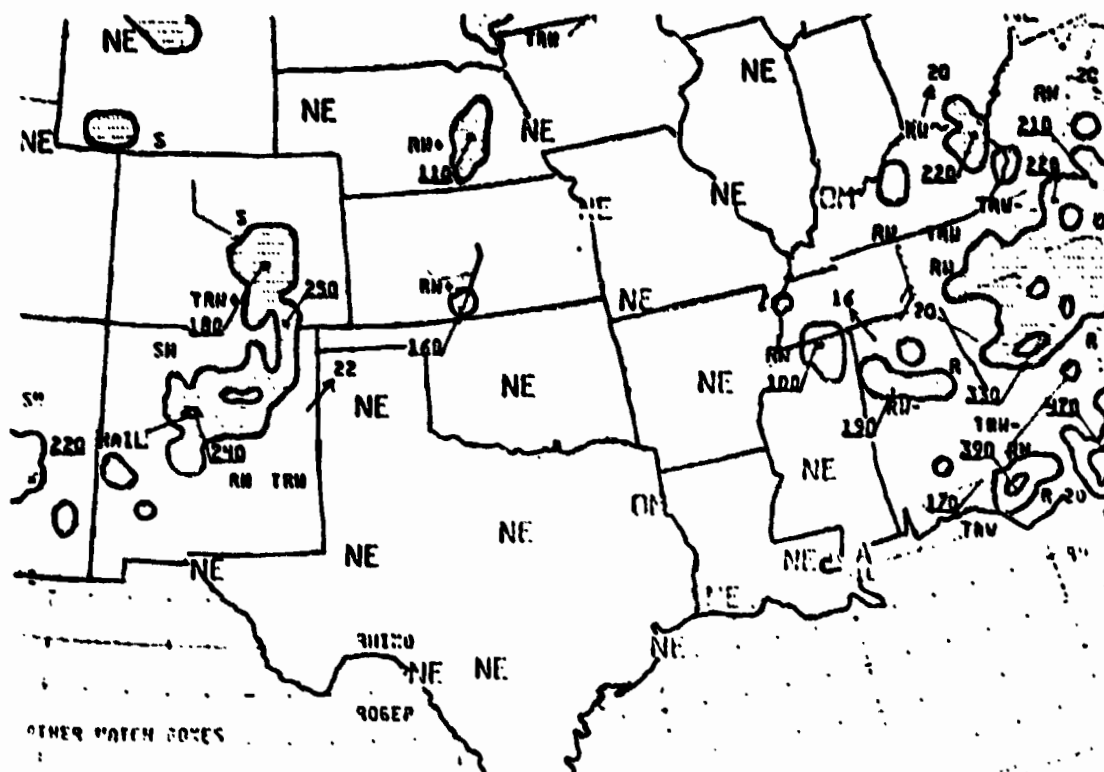


Fig. 12. Radar summary for 1935 GMT 9 May 1979.

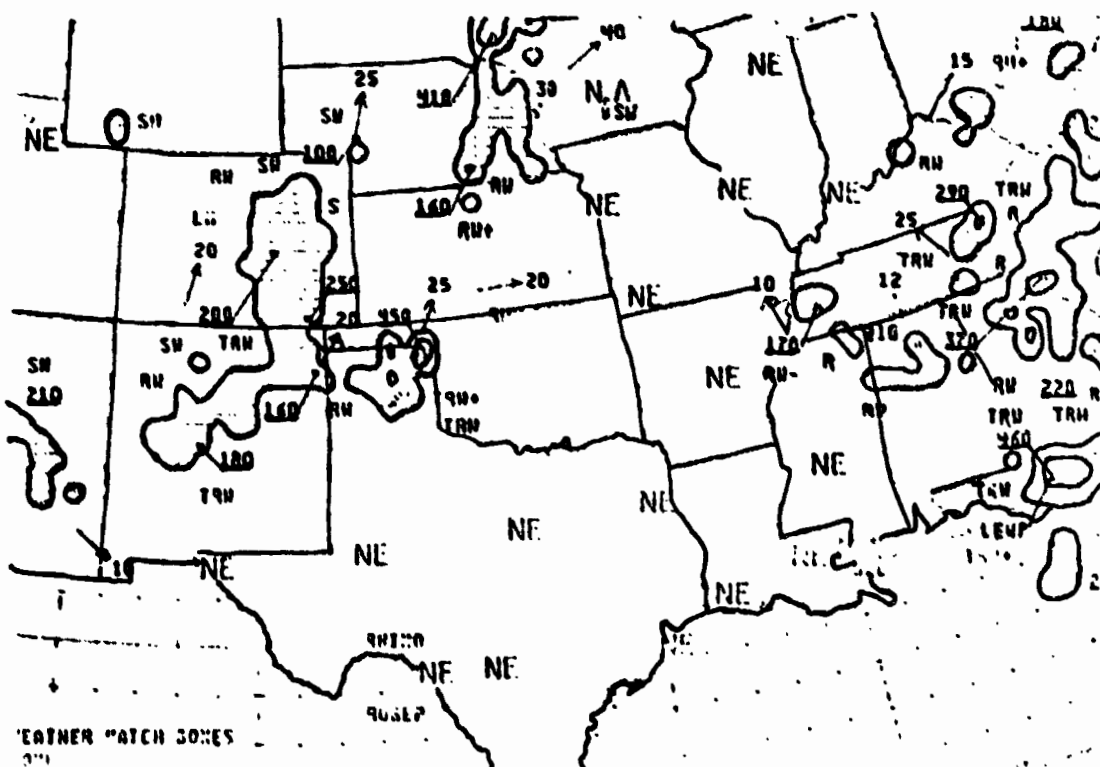


Fig. 13. Radar summary for 2135 GMT 9 May 1979.

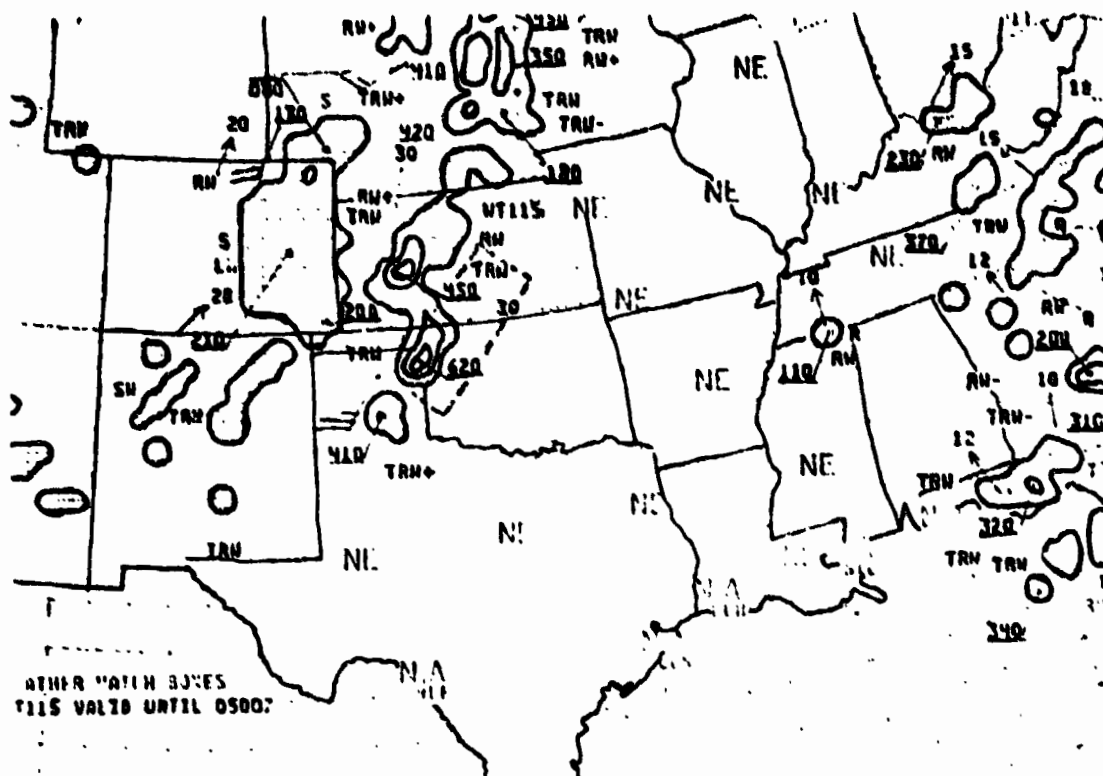


Fig. 14. Radar summary for 2335 GMT 9 May 1979.

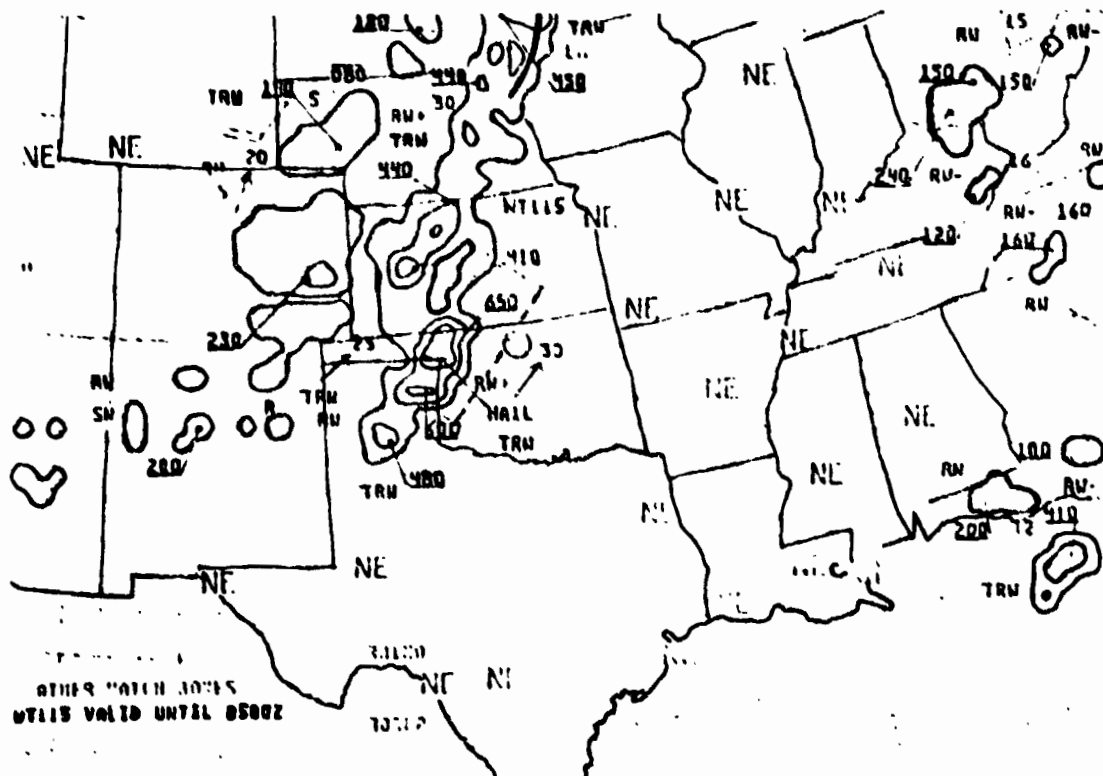


Fig. 15. Radar summary for 0135 GMT 10 May 1979.

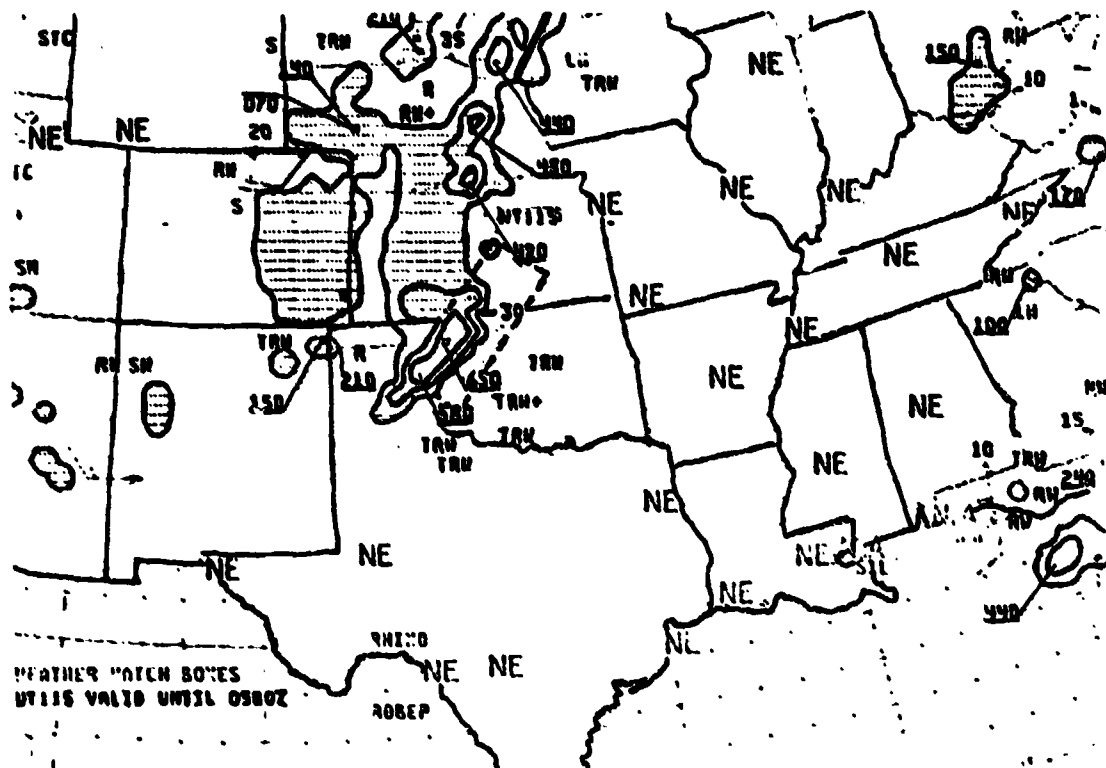


Fig. 16. Radar summary for 0235 GMT 10 May 1979.

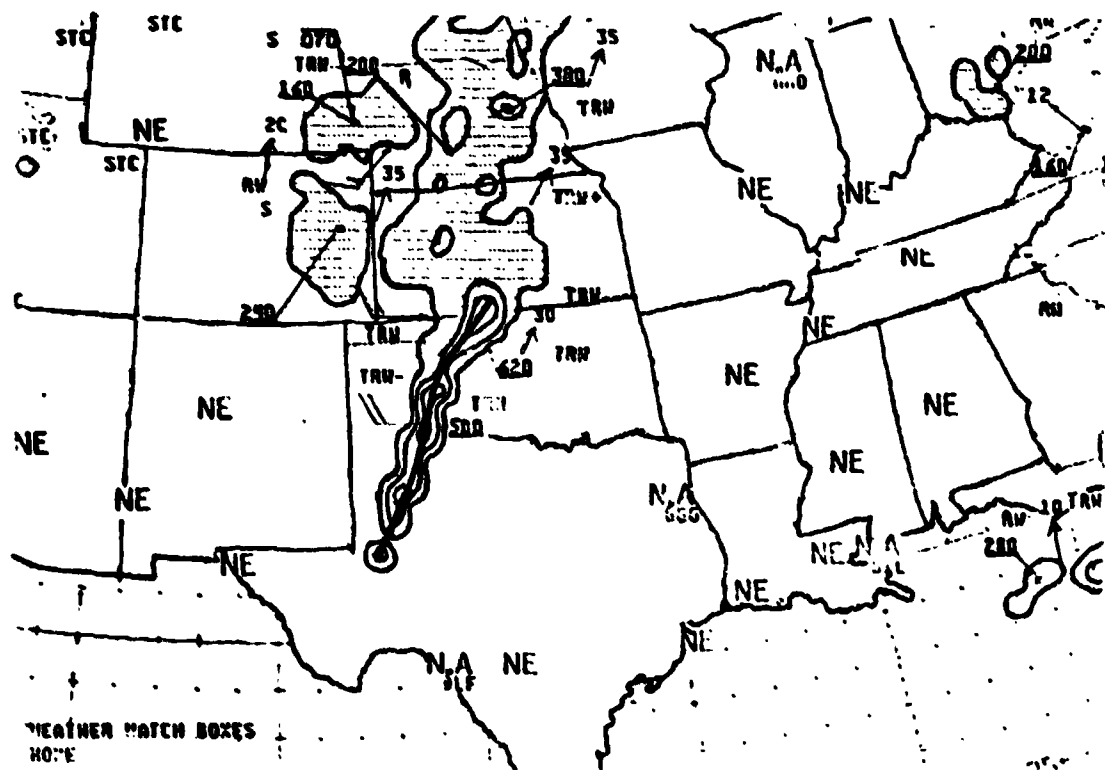


Fig. 17. Radar summary for 0435 GMT 10 May 1979.

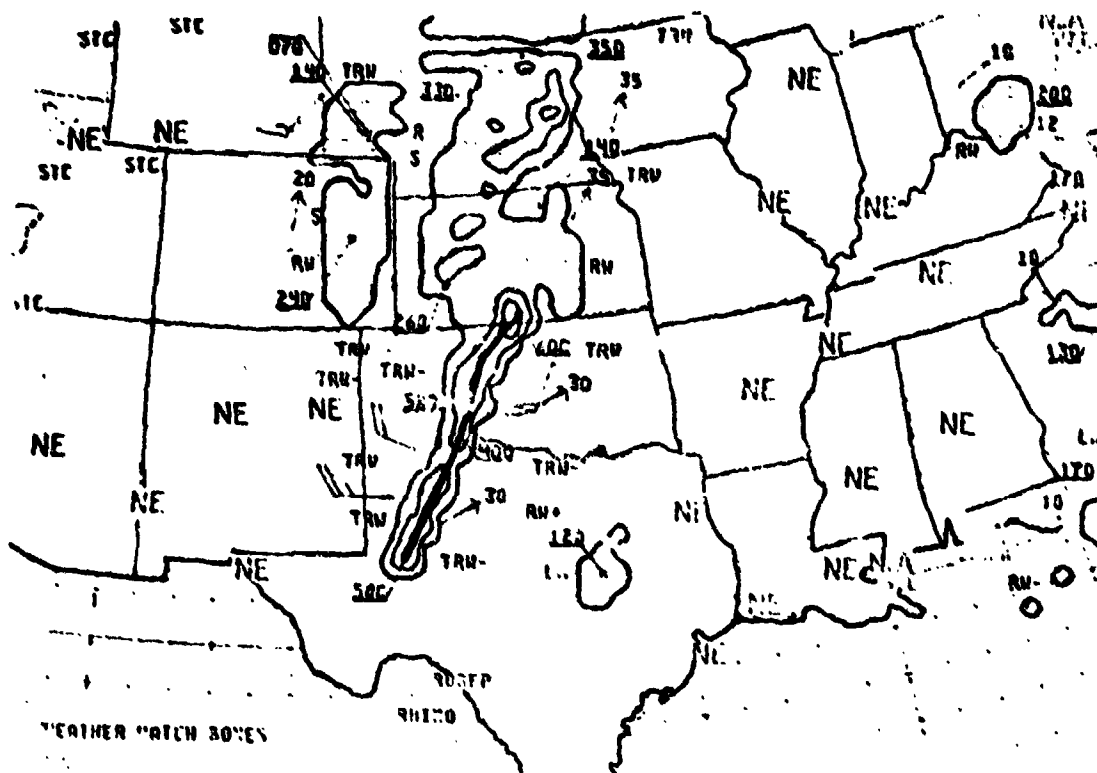


Fig. 18. Radar summary for 0535 GMT 10 May 1979.

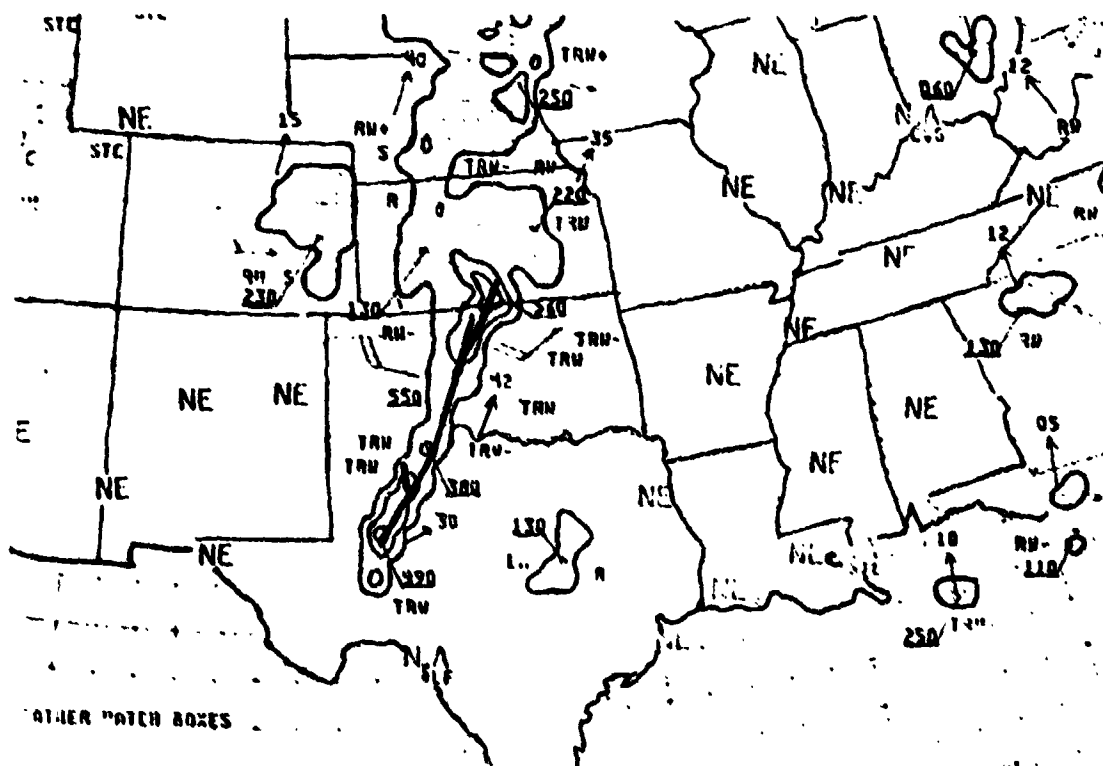


Fig. 19. Radar summary for 0635 GMT 10 May 1979.

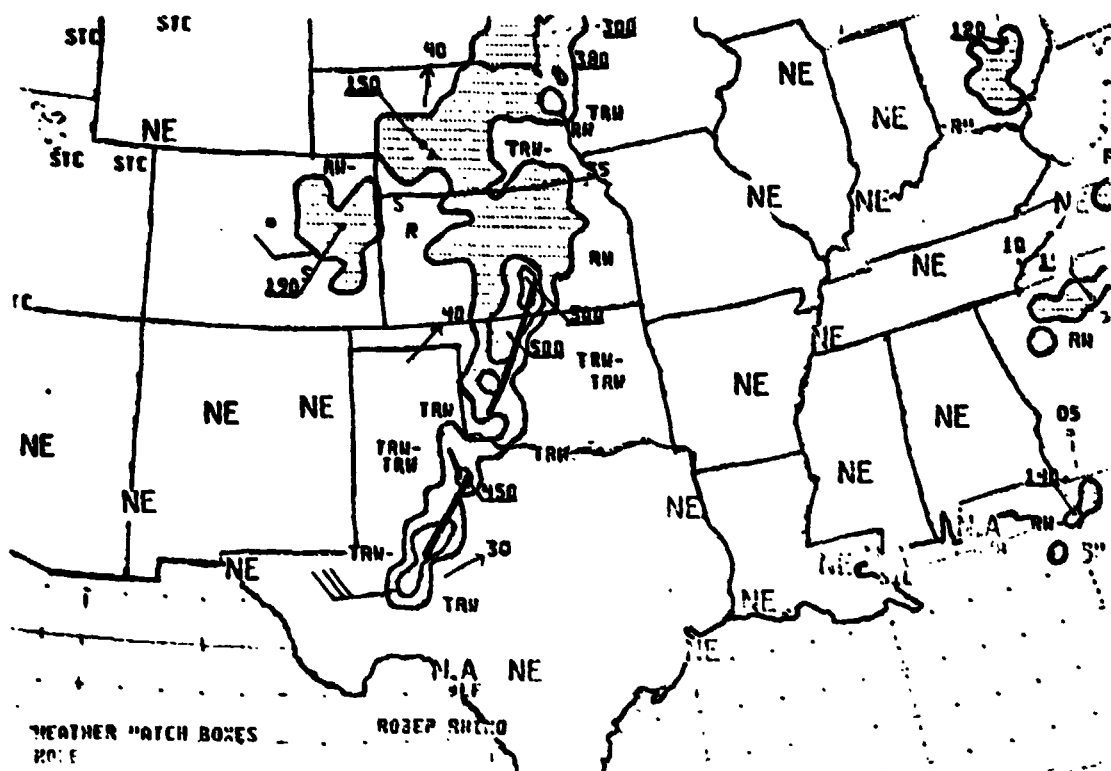


Fig. 20. Radar summary for 0735 GMT 10 May 1979.

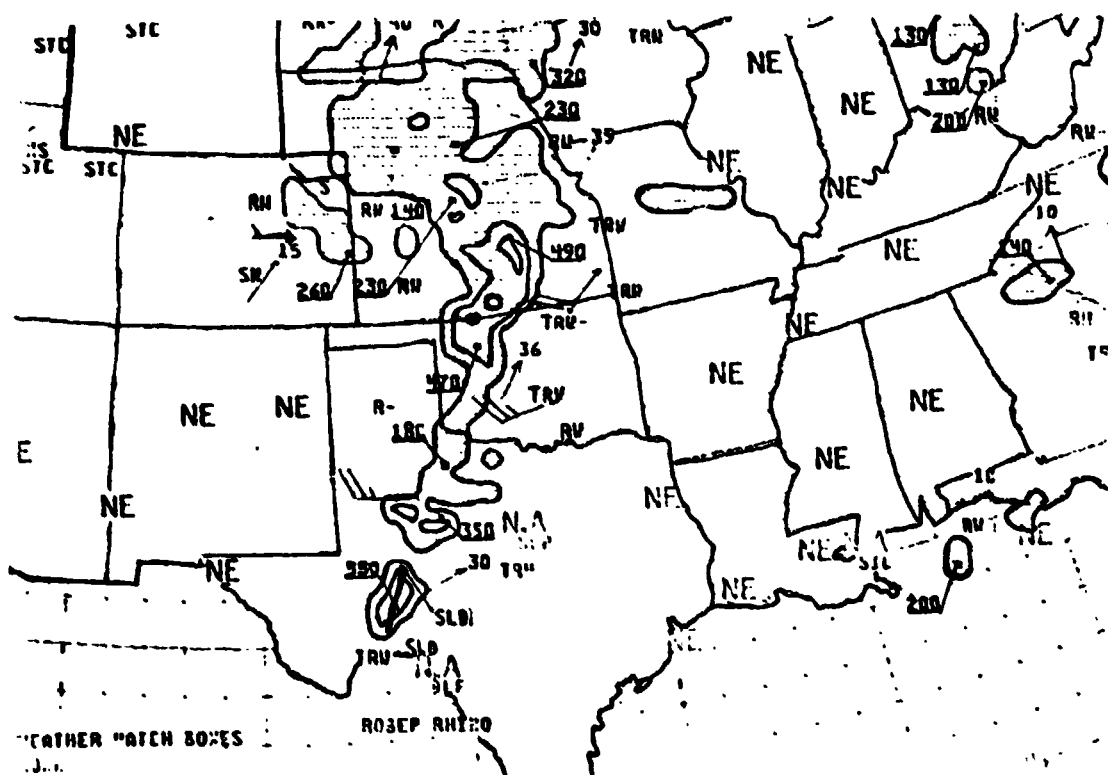


Fig. 21. Radar summary for 0835 GMT 10 May 1979.

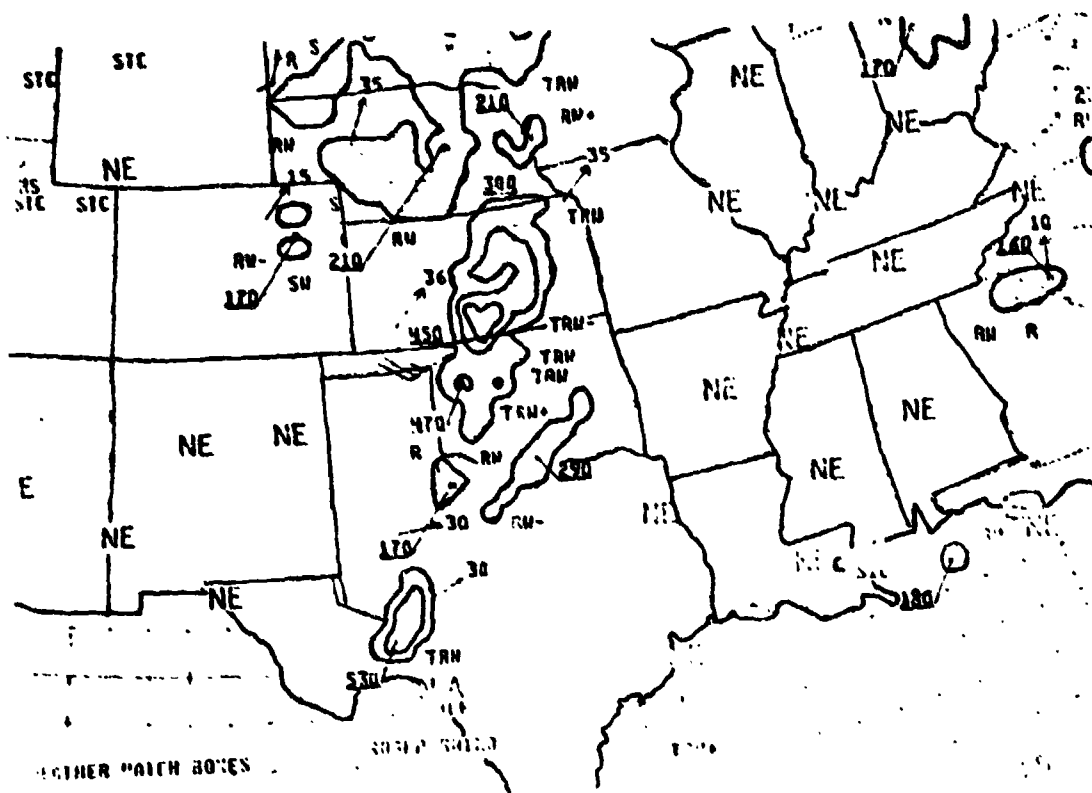


Fig. 22. Radar summary for 0935 GMT 10 May 1979.

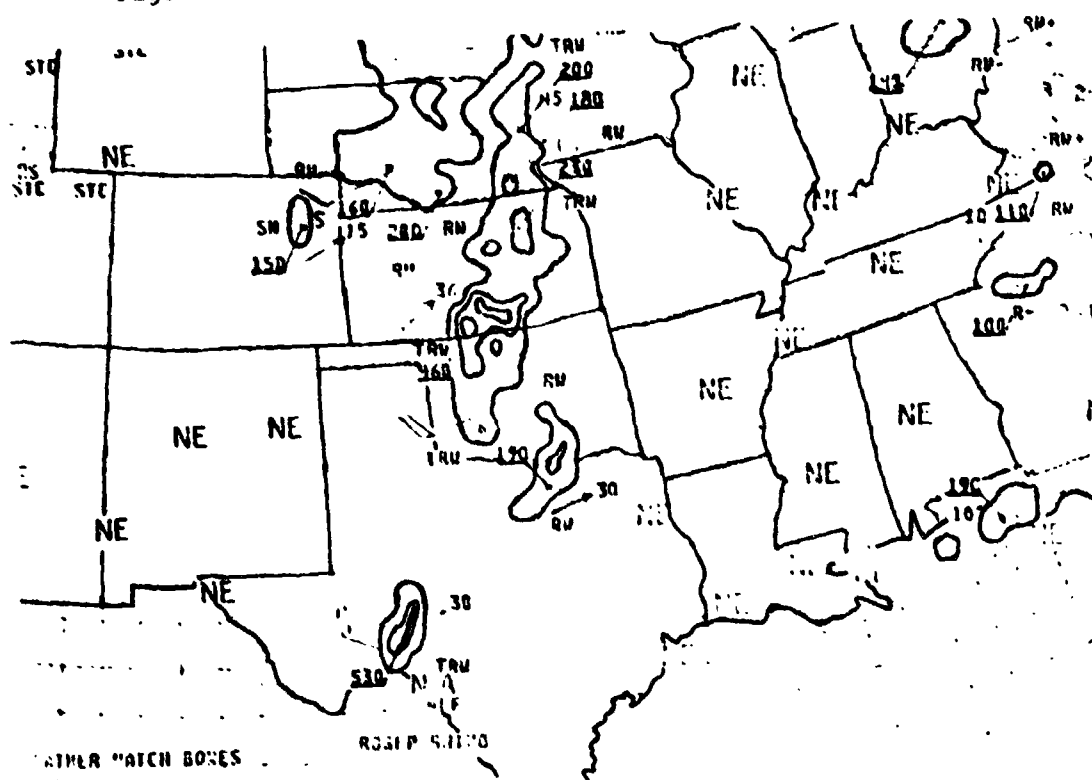


Fig. 23. Radar summary for 1035 GMT 10 May 1979.

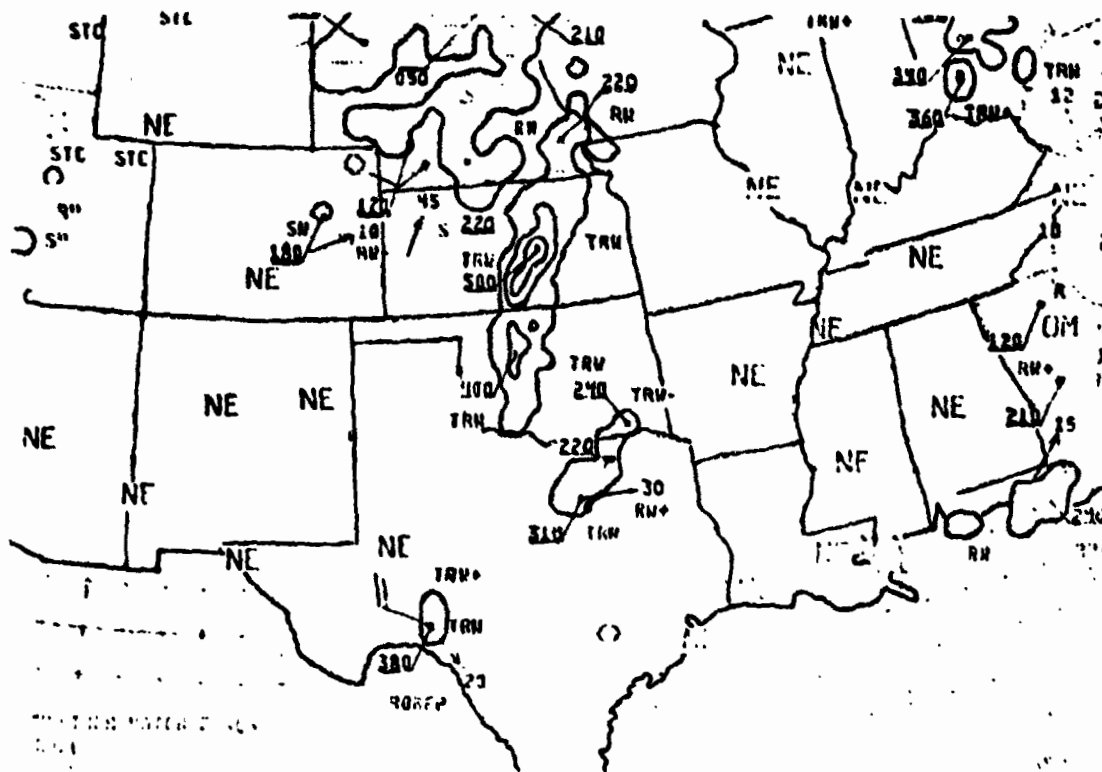


Fig. 24. Radar summary for 1135 GMT 10 May 1979.

1216 09MY79 12E-4MB 00812 14761 KC35N90W-2

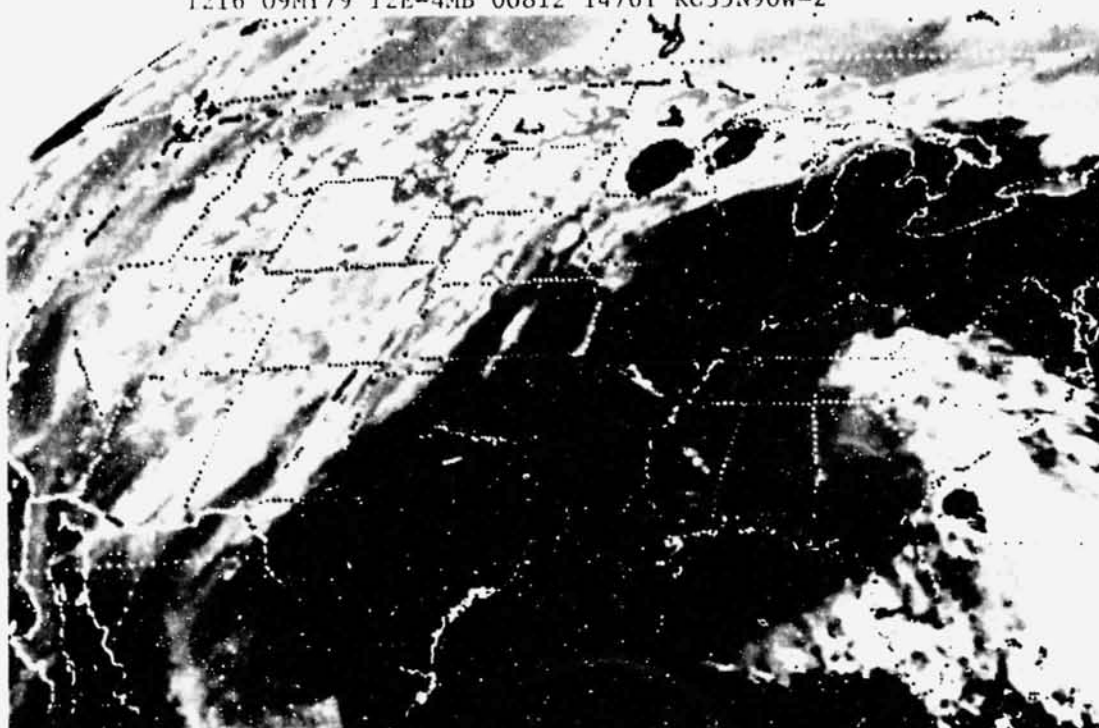


Fig. 25. GOES-East infrared satellite imagery for 1216 GMT
9 May 1979.

1316 09MY79 12A-2 01533 13582 PQ34N94W-1

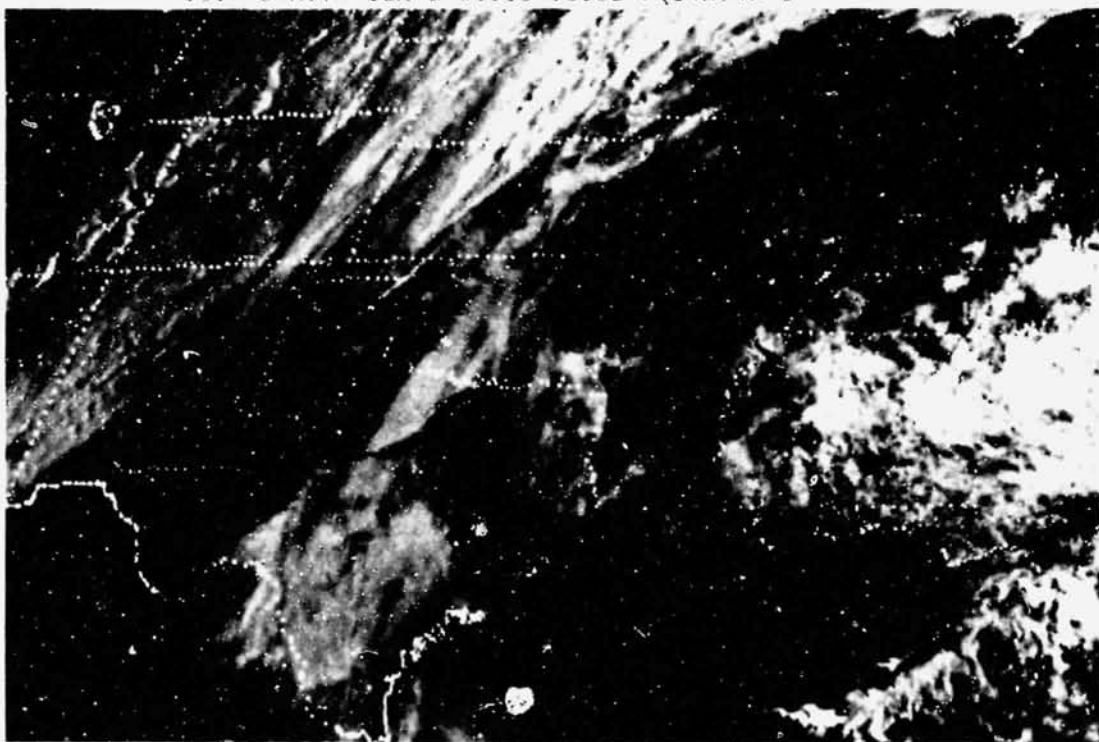


Fig. 26. GOES-East visual satellite imagery for 1316 GMT
9 May 1979.

1416 09MY79 12A-2 01543 13582 PQ34N94W-1

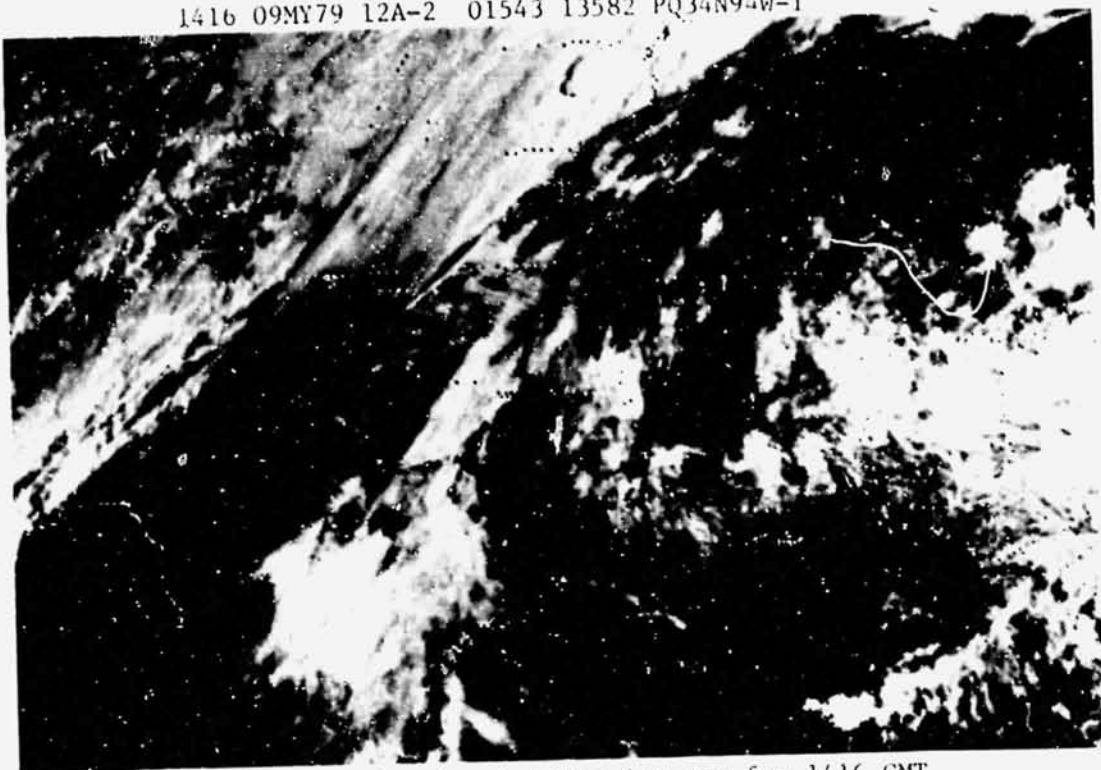


Fig. 27. GOES-East visual satellite imagery for 1416 GMT
9 May 1979.

1513 09MY79 12A-2 06001 03581 PQ34N95W-1

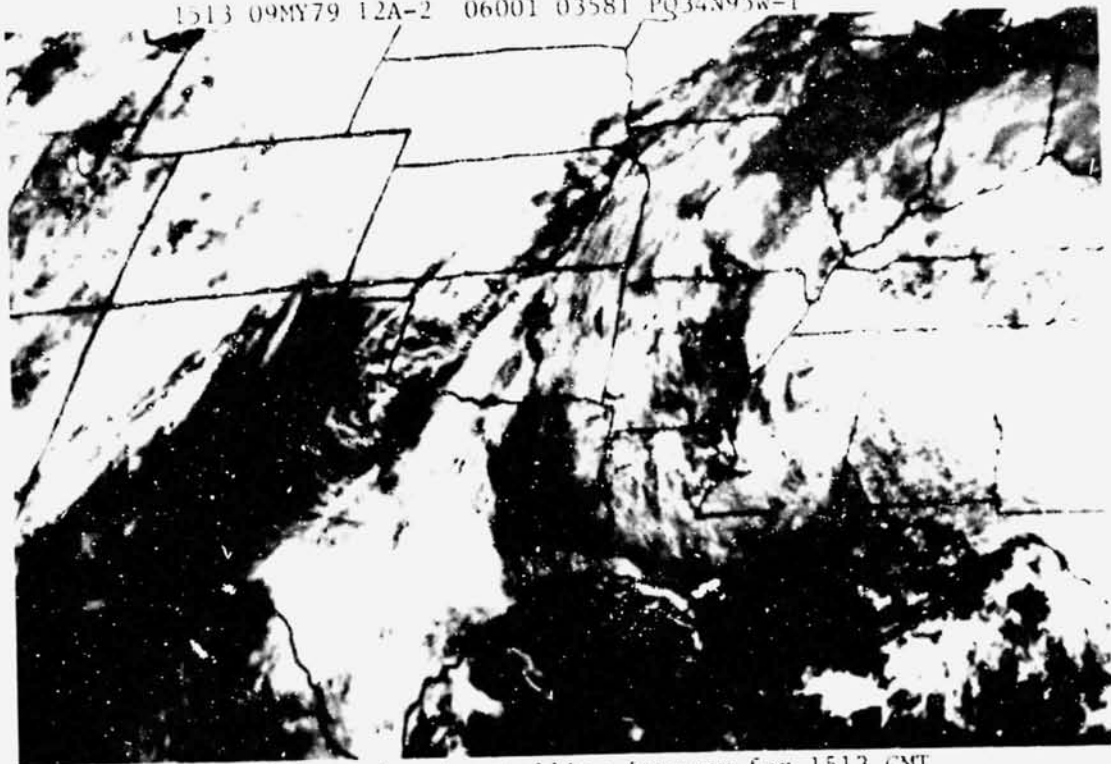


Fig. 28. GOES-East visual satellite imagery for 1513 GMT
9 May 1979.

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1614 09MY79 12A-2 00011 13581 PQ34N95W-1

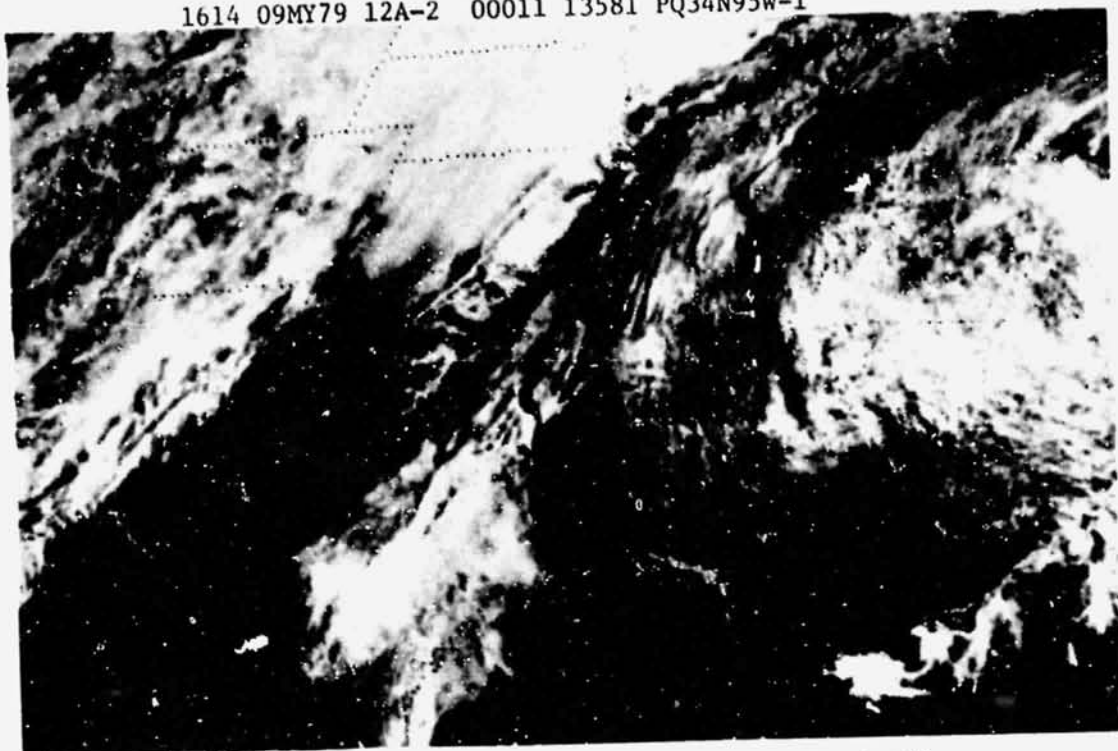


Fig. 29. GOES-East visual satellite imagery for 1614 GMT
9 May 1979.

1713 09MY79 12A-2 00011 13581 PQ34N95W-1

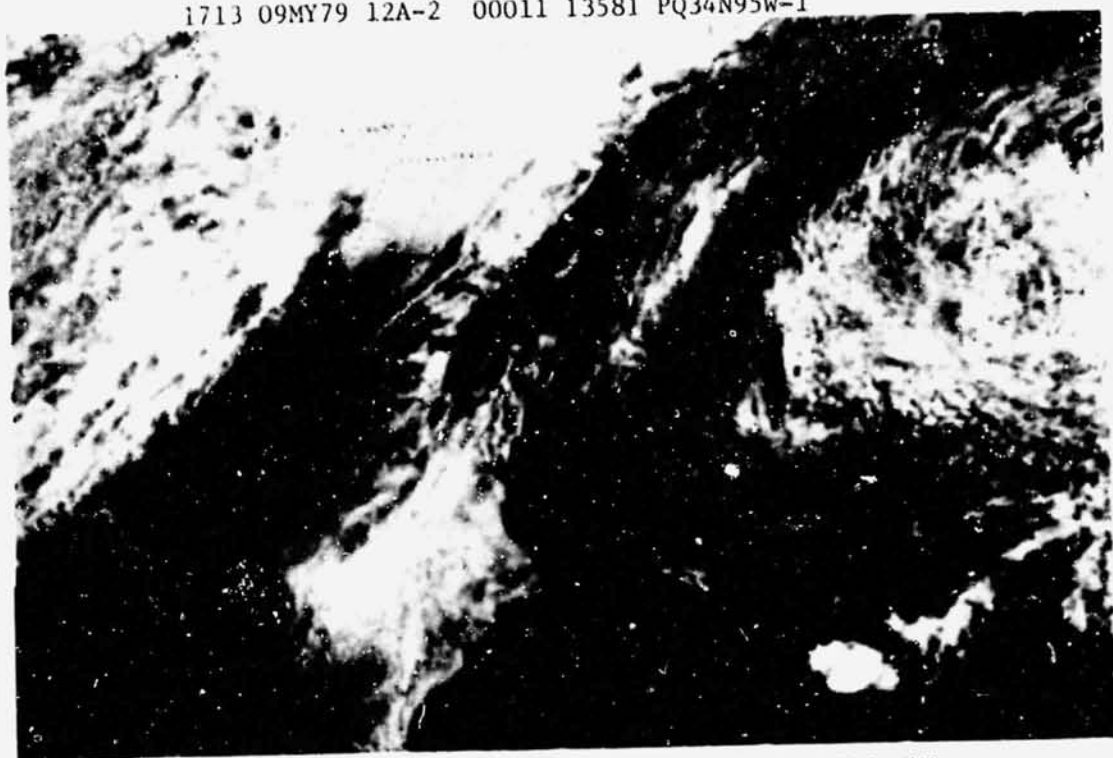


Fig. 30. GOES-East visual satellite imagery for 1713 GMT
9 May 1979.

1813 09MY79 12A-2 06001 13581 PQ34N95W-1

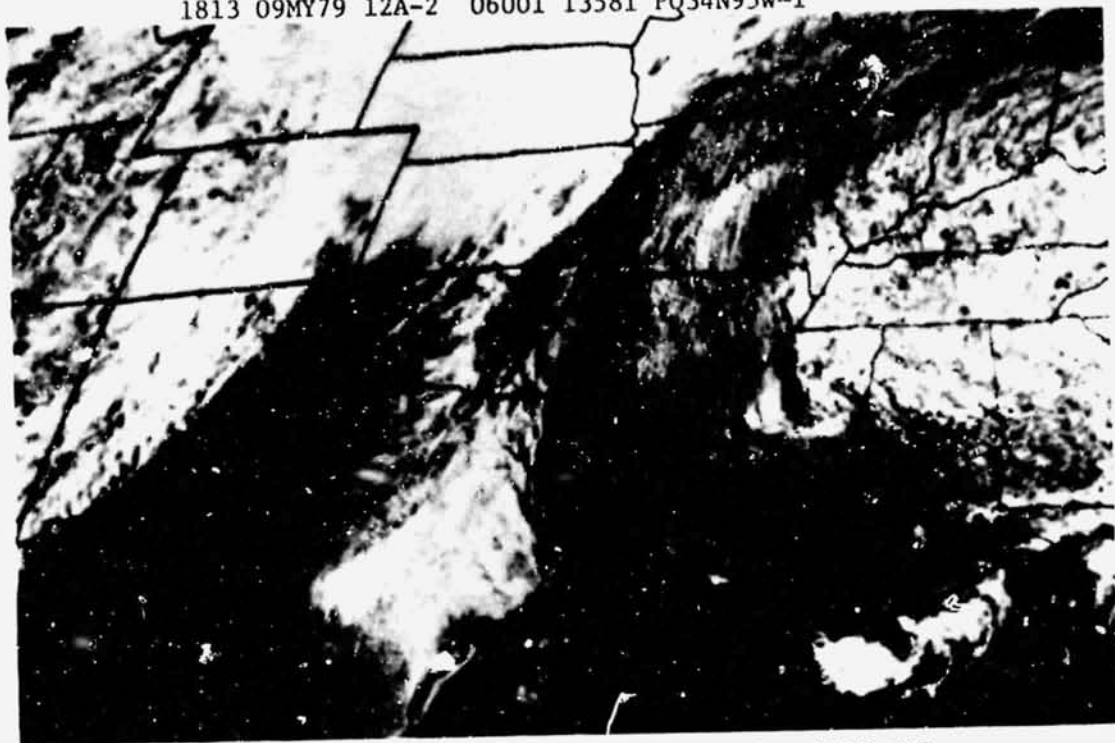


Fig. 31. GOES-East visual satellite imagery for 1813 GMT
9 May 1979.

1931 09MY79 12A-2 01542 13572 PQ34N94W-1



Fig. 32. GOES-East visual satellite imagery for 1931 GMT
9 May 1979.

2031 09MY79 12A-2 01542 13572 PQ34N94W-1

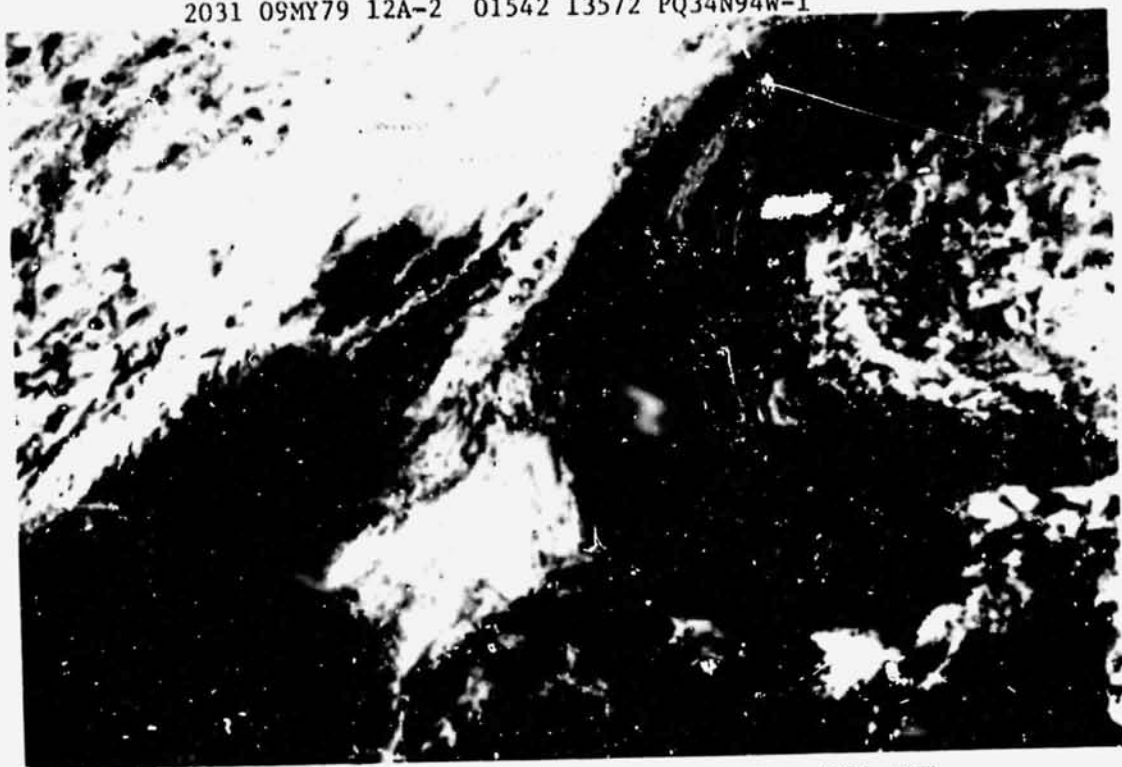


Fig. 33. GOES-East visual satellite imagery for 2031 GMT
9 May 1979.

2114 09MY79 12A-2 00911 13581 PQ34N95W-1

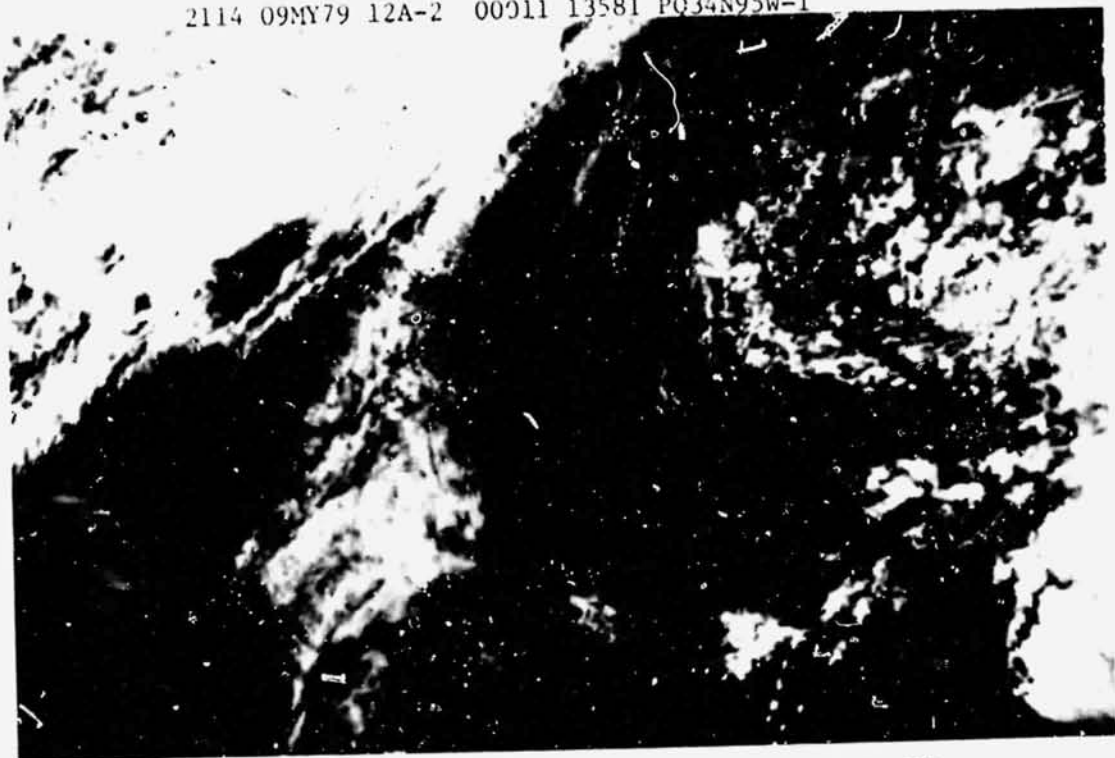


Fig. 34. GOES-East visual satellite imagery for 2114 GMT
9 May 1979.

2214 09MY79 12A-2 00011 13581 PQ34N95W-1

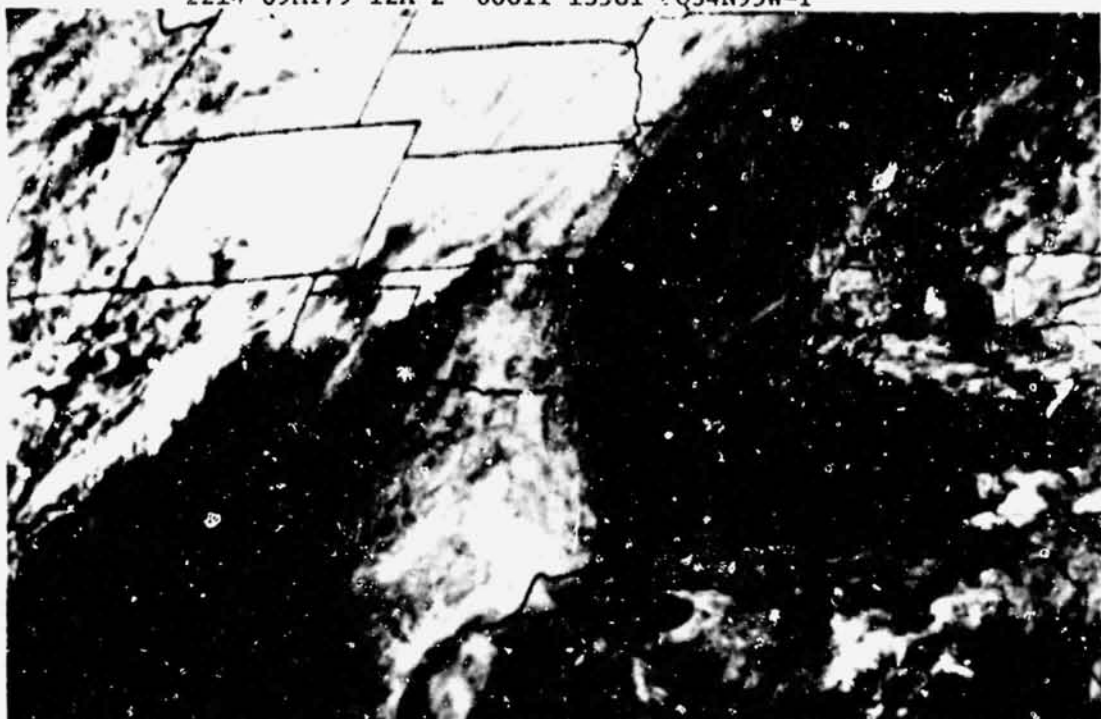


Fig. 35. GOES-East visual satellite imagery for 2214 GMT
9 May 1979.

2343 09MY79 12A-2 060001 13581 PQ34N95W-1

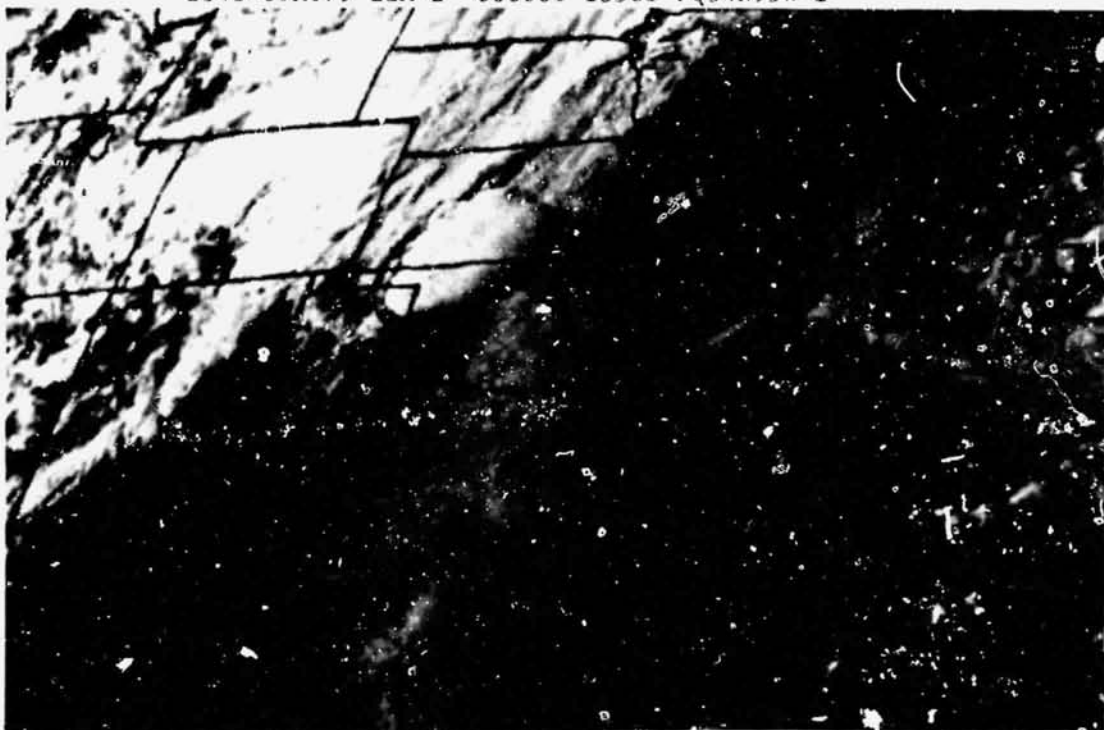


Fig. 36. GOES-East visual satellite imagery for 2343 GMT
9 May 1979.

0143 10MY79 12E-4MB 06001 14761 KC35N90W-2

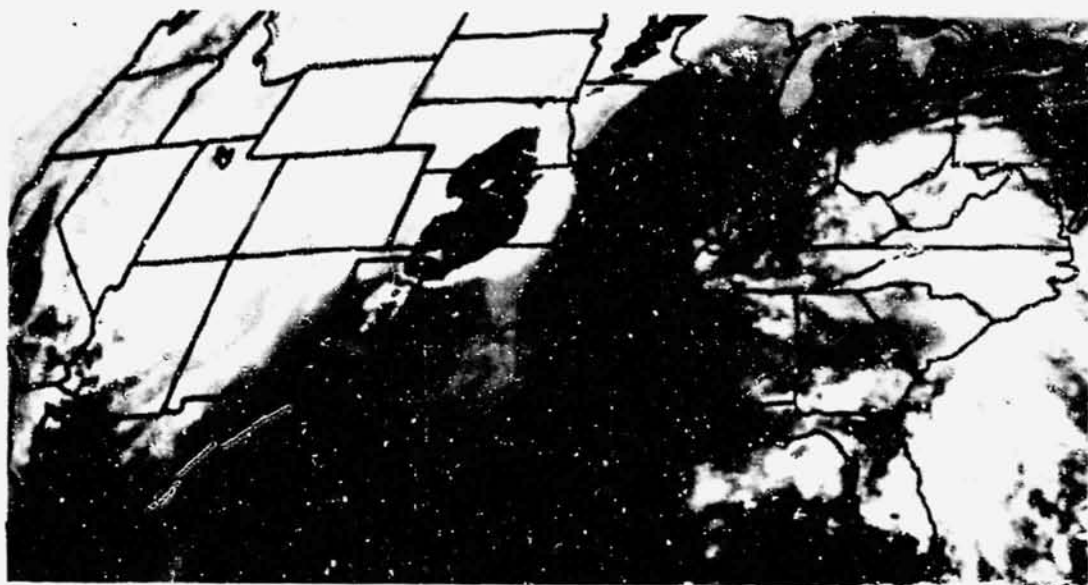


Fig. 37. GOES-East infrared satellite imagery for 0143 GMT
10 May 1979.

0243 10MY79 12E-4MB 06001 14761 KC35N90W-2



Fig. 38. GOES-East infrared satellite imagery for 0243 GMT
10 May 1979.

0445 10MY79 12E-4MB 00812 14741 KC35N90W-2

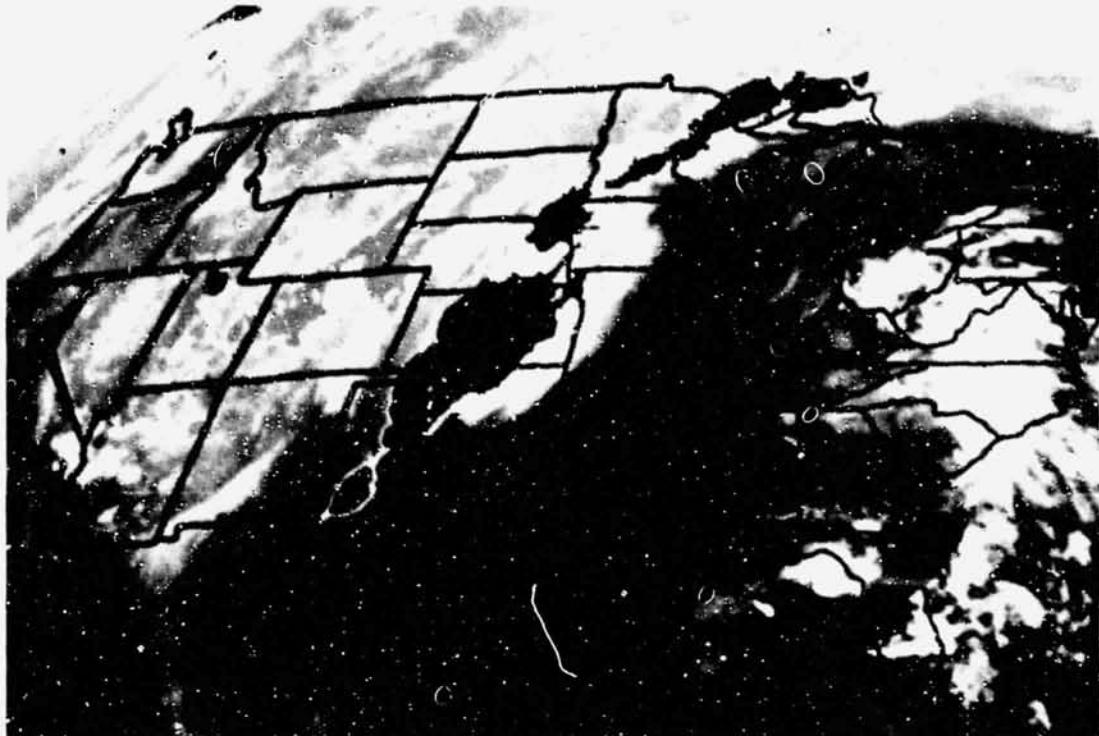


Fig. 39. GOES-East infrared satellite imagery for 0445 GMT 10 May 1979.

0515 10MY79 12E-4MB 00801 14741 KC35N90W-2

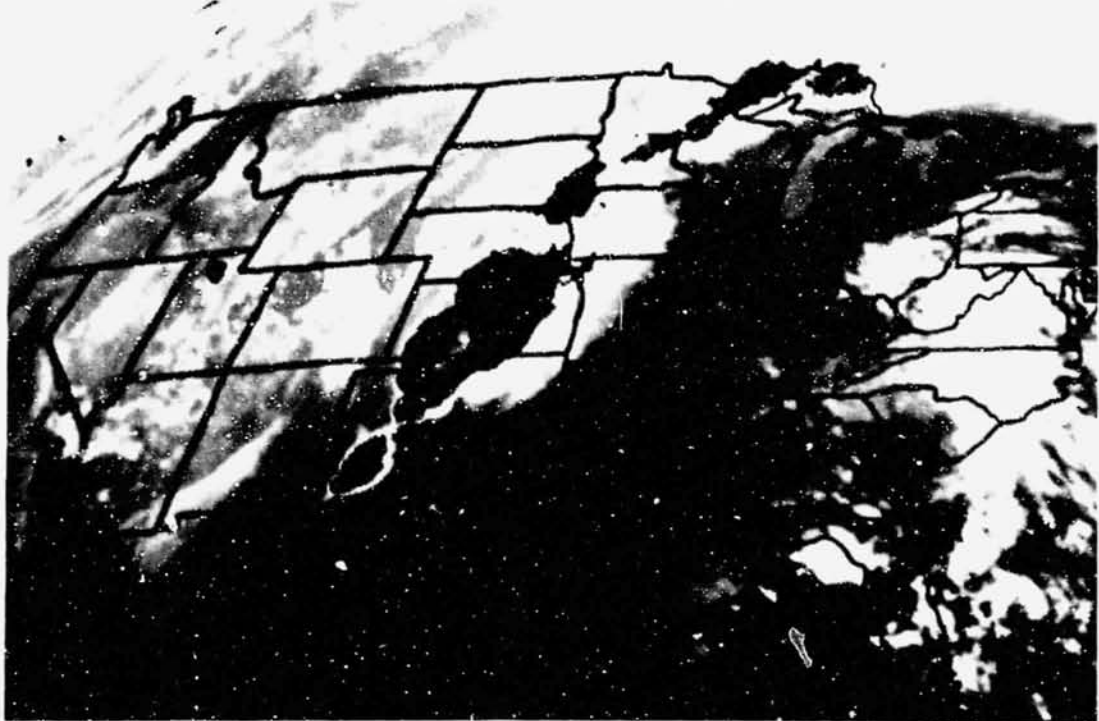


Fig. 40. GOES-East infrared satellite imagery for 0515 GMT 10 May 1979.

0601 10MY79 12E-2MB 32 13281 KB34N95W-1

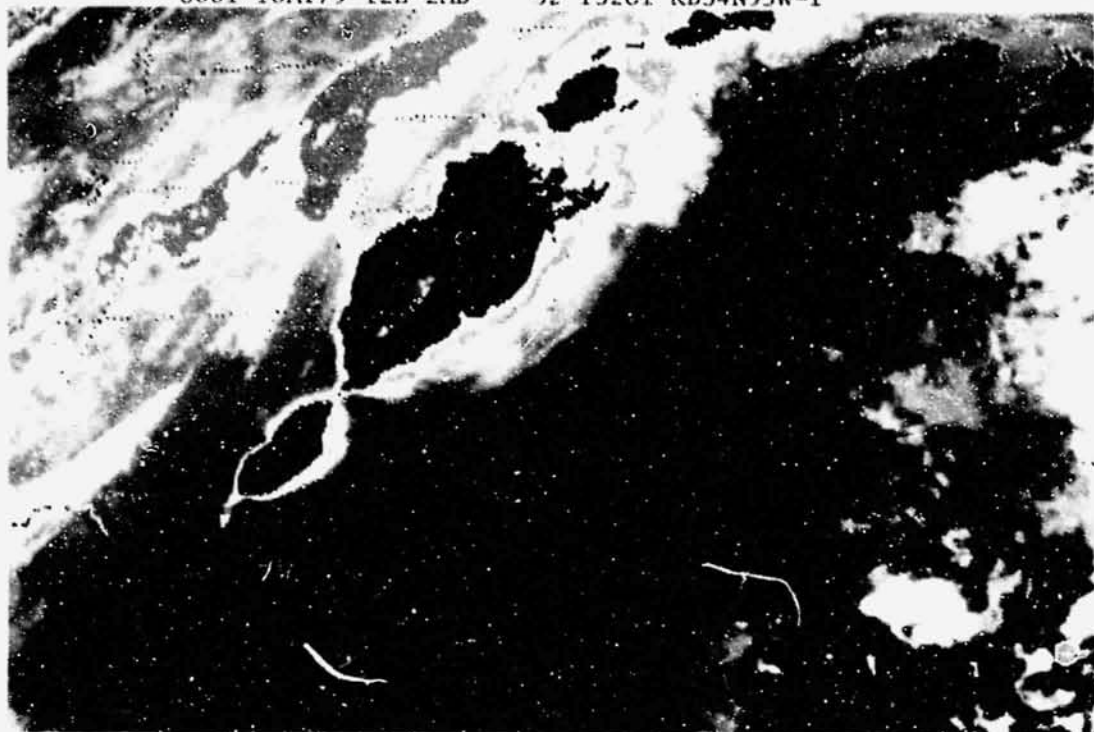


Fig. 61. GOMS-East infrared satellite imagery for 0601 GMT
10 May 1979.

0700 10MY79 12E-4MB 00092 14451 KC30N90W-1

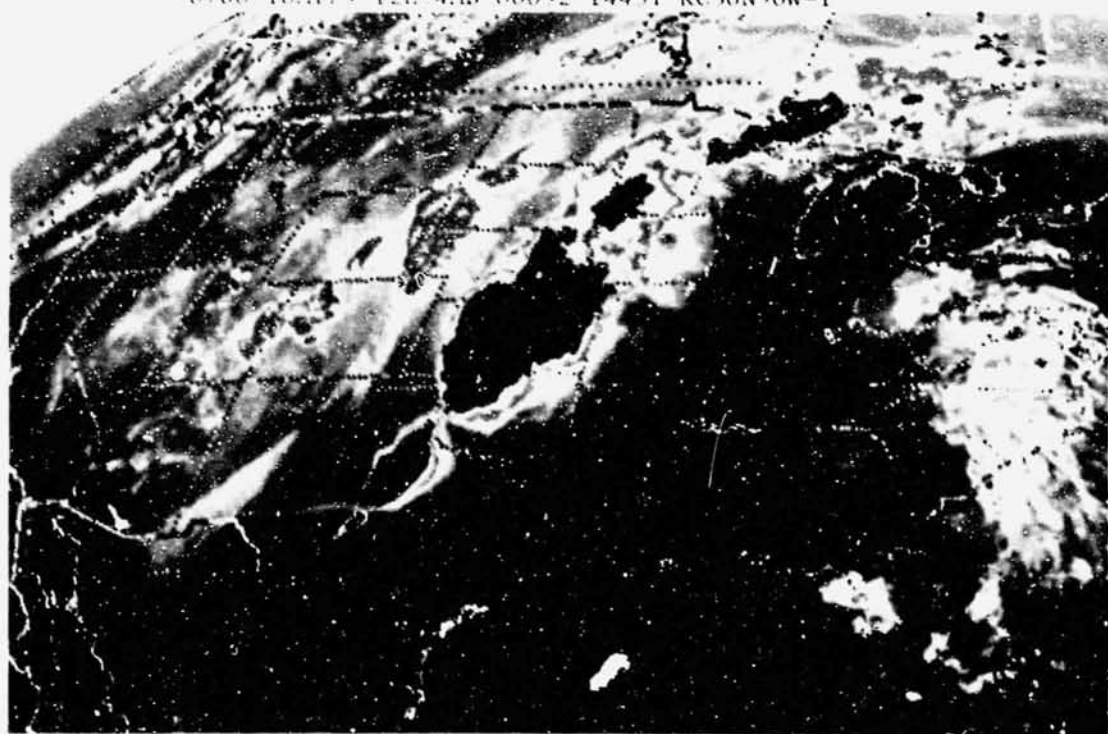


Fig. 62. GOMS-East infrared satellite imagery for 0700 GMT
10 May 1979.

0800 10MY79 12E-4MB 00102 14451 KC30N90W-2

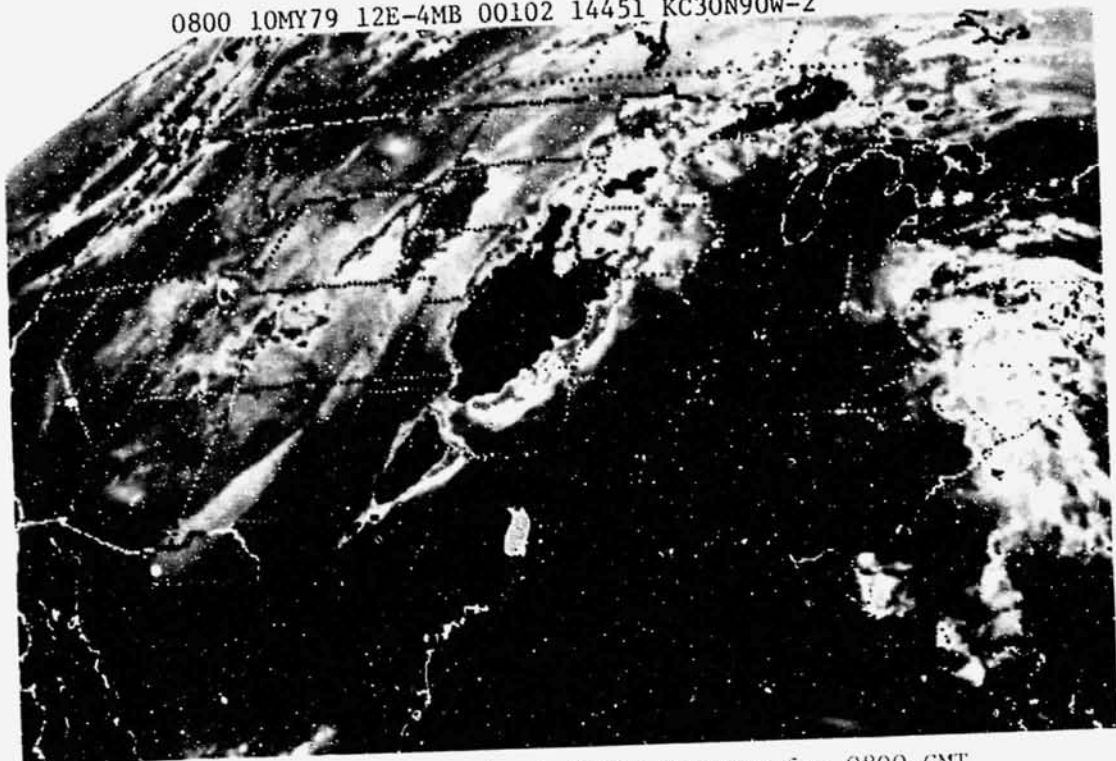


Fig. 43. GOES-East infrared satellite imagery for 0800 GMT
10 May 1979.

0900 10MY79 12E-4MB 00101 14451 KC30N90W-2

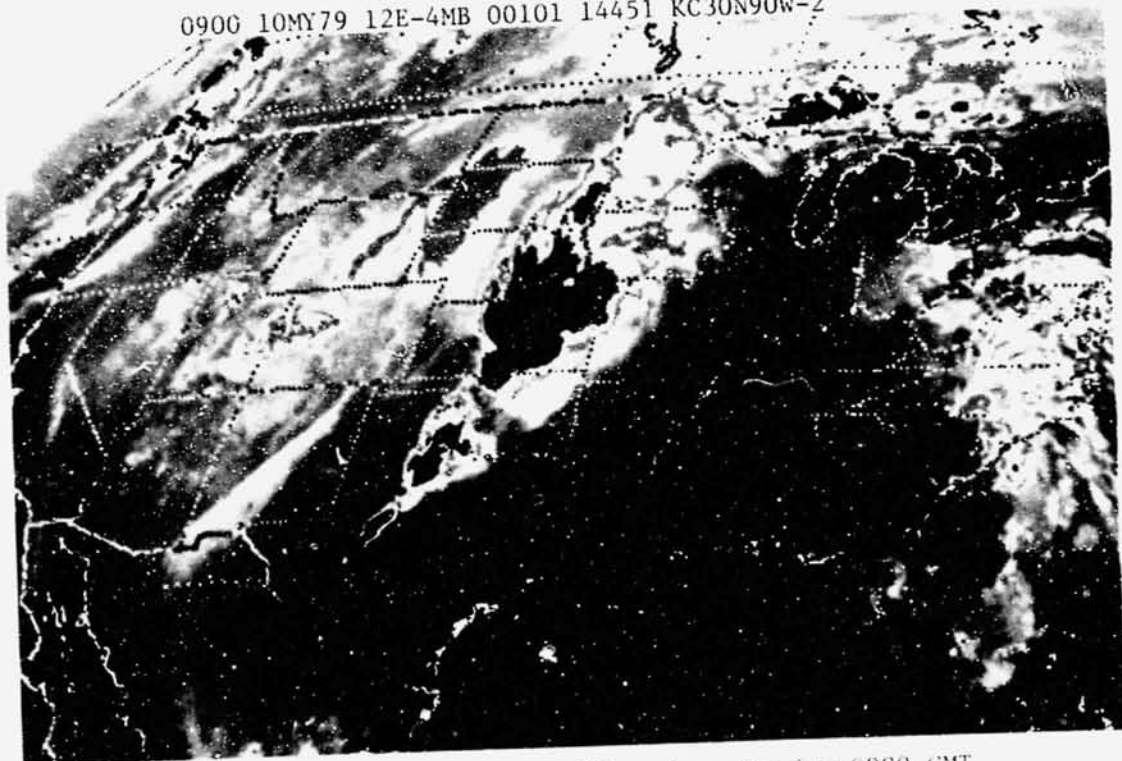


Fig. 44. GOES-East infrared satellite imagery for 0900 GMT
10 May 1979.

1000 10MY79 12E-4MB 00102 14451 KC30N90W-2

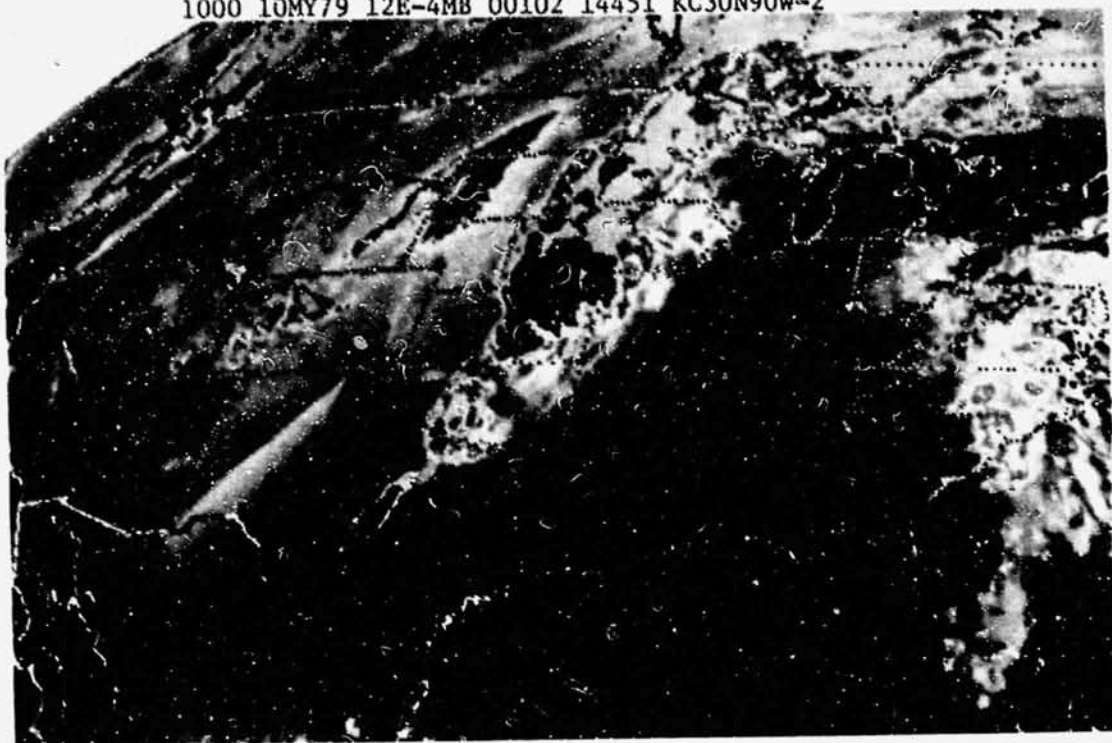


Fig. 45. GOES-East infrared satellite imagery for 1000 GMT
10 May 1979.

1100 10MY79 12E-4MB 00102 14451 KC30N90W-2

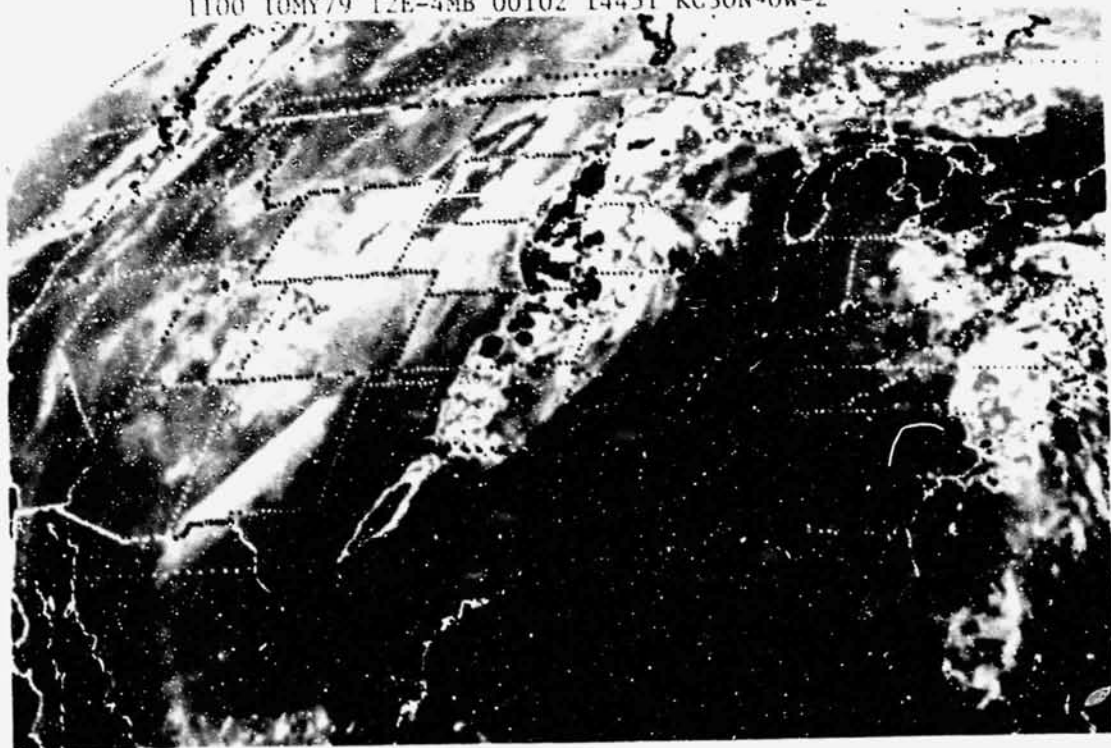


Fig. 46. GOES-East infrared satellite imagery for 1100 GMT
10 May 1979.

1200 10MY79 12E-4MB 00111 14461 KC30N90W-2



Fig. 47. GOFs-East infrared satellite imagery for 1200 GMT
10 May 1979.

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TABLE 2. Teletype reports of severe and unusual weather from 1200 GMT 9 May to 1200 GMT 10 May 1979 taken from NOAA weather wire and national weather summaries.

<u>EVENT</u>	<u>LOCATION</u>	<u>TIME (GMT)</u>
RIME ICE	MODERATE RIME ICE ENCOUNTERED BY AIRCRAFT OVER CORPUS CHRISTI, TX	1231
HIGH WINDS	WINDS GUSTING TO 53 MPH AT PAGE, OK	1300
ICE	AIRCRAFT ENCOUNTERED HEAVY ICE OVER DENVER, CO	1308
HEAVY SNOW WARNING	NWS HAS ISSUED A HEAVY SNOW WARNING FOR COLORADO AND THE SE AND CENTRAL MOUNTAIN AREAS AND FOOT-HILLS OF WYOMING FOR TODAY	1400
CONVECTIVE SIGMET	FROM 25 MI SW OF SIOUX FALLS, SD TO 35 MI NE OF GRAND ISLAND, NE TO 35 MI S OF O'NEILL, NE. THIS AREA OF EMBEDDED TSTMS IS MOVING NNE AT 40 MPH. MAX TOPS TO 45,000 FT.	1455
TURBULENCE	MODERATE TO SEVERE TURBULENCE ENCOUNTERED BY AIRCRAFT OVER TRUTH OR CONSEQUENCES, NM	1500
HIGH WINDS	WINDS GUSTING TO 48 MPH AT PAGE, OK	1522
CONVECTIVE SIGMET	FROM 45 MI NW OF SIOUX FALLS, SD TO 35 MI SE OF SIOUX FALLS, SD TO 60 MI NE OF GRAND ISLAND, NE TO 35 MI SSW OF O'NEILL, NE. ACTIVITY MOVING NNE AT 40 MPH. MAX TOPS TO 50,000 FT.	1555
HIGH WINDS	WINDS GUSTING TO 71 MPH AT GUADALUPE/DAVIS MOUNTAINS, TX	1750
RIME ICE	AIRCRAFT ENCOUNTERED 3/4 INCH RIME ICE OVER COLORADO SPRINGS, CO	1823
ICT RAREP	A FINE LINE OF TSTMS 35 MI ENE OF RUSSELL, KS TO 30 MI SSE OF RUSSELL TO 55 MI ESE OF DODGE CITY, KS IS MOVING TO THE EAST AT 7 MPH	1830
TURBULENCE, ICING	MODERATE TO SEVERE TURBULENCE AND 1/2 INCH RIME ICE ENCOUNTERED BY AIRCRAFT OVER ALBUQUERQUE, NM	1850
ICT RAREP	A FINE LINE OF TSTMS 25 MI E OF RUSSELL, KS TO 30 MI ESE OF RUSSELL TO 70 MI NE OF GAGE, OK IS MOVING AT 6 MPH TO THE EAST	1930
TURBULENCE	AIRCRAFT ENCOUNTERED MODERATE TO SEVERE TURBULENCE OVER GUNNISON, CO	2031

TABLE 2. CONTINUED.

<u>EVENT</u>	<u>LOCATION</u>	<u>TIME (GMT)</u>
TURBULENCE	AIRCRAFT ENCOUNTERED SEVERE TURBULENCE OVER ROSWELL, NM	2115
OKC RAREP	NEW LINE 14 MI WIDE OF TSTMS DEVELOPING 7 MI N OF GAGE, OK TO 30 MI ENE OF AMARILLO, TX	2130
ICT RAREP	AREA OF LIGHT SHOWERS OVER S CENTRAL KANSAS. THIS AREA IS MOVING TO THE EAST AT 25 MPH	2130
AMA RAREP	A SCATTERED AREA OF RAPIDLY INCREASING TRW++ FROM THE N CENTRAL TEXAS PANHANDLE TO THE EASTERN EDGE OF THE OKLAHOMA PANHANDLE. CELL MOVEMENT IS AT 28 MPH AND TO THE NNW. MAX TOPS TO 45,000 FT. LOCATED 123 MI NE OF AMARILLO, TX	2135
CONVECTIVE SIGMET, HAIL	A LINE OF TSTMS 25 MI WIDE FROM 70 MI WSW OF WICHITA, KS TO 45 MI NE OF AMARILLO, TX IS MOVING TO THE EAST AT 25 MPH. MAX TOPS TO 50,000 FT. WITH 1-3/4 INCH HAIL REPORTED IN THIS LINE	2155
SVR TSTM WARNING	A SVR TSTM WARNING HAS BEEN ISSUED FOR GRAY, HEMPHILL, LIPSCOMB, AND ROBERTS COUNTIES OF TEXAS UNTIL 6:00 P.M. CDT. AT 5:00 P.M. AMARILLO RADAR INDICATED SVR TSTMS SW OF PAMPA, TX, W OF MIAMI, TX, AND W OF CANDIAN, TX. MOVEMENT WAS TO THE NE BETWEEN 20-25 MPH	2200
TORNADO WARNING	A TORNADO WARNING FOR ROBERTS AND HEMPHILL COUNTIES OF TEXAS HAS BEEN ISSUED UNTIL 6:15 P.M. CDT. AT 5:15 P.M. AMARILLO RADAR INDICATED A TORNADO 5 MI W OF MIAMI, TX. THE TORNADO WAS MOVING AT 25 MPH TO THE NE	2215
TORNADO WATCH	50 MI ON EITHER SIDE OF A LINE FROM 60 MI SSW OF GAGE, OK TO 40 MI ENE OF HUTCHINSON, KS. THIS WATCH IS EFFECTIVE FROM 5:45 P.M. CDT UNTIL MIDNIGHT	2215
ICT RAREP	SCATTERED TRW++ COVERING PARTS OF CENTRAL AND SW KANSAS, EXTREME NW OKLAHOMA, AND THE NE PART OF THE TEXAS PANHANDLE. MOVEMENT IS TO THE NNE AT 35 MPH WITH MAX TOPS TO 40,000 FT. APPARENT TRWXX 183 MI SW OF WICHITA, KS	2230
TORNADO WARNING	WARNING ISSUED FOR HEMPHILL AND LIPSCOMB COUNTIES OF TEXAS UNTIL 7:30 P.M. CDT. AMARILLO RADAR INDICATED A POSSIBLE TORNADO AND FUNNEL CLOUDS WERE REPORTED BY THE PUBLIC	2300

TABLE 2. CONTINUED.

<u>EVENT</u>	<u>LOCATION</u>	<u>TIME (GMT)</u>
AMA RAREP	AN AREA OF TRWXX 6 MI ON EITHER SIDE OF A LINE FROM 5 MI NW OF GAGE, OK TO 40 MI SW OF GAGE. AREA MOVEMENT AT 30 MPH TO THE NE. MAX TOPS TO 60,000 FT. 95 MI NE OF AMARILLO, TX WITH HAIL INDICATED	2305
TORNADO	TORNADO REPORTED 51 MI SW OF GAGE, OK	2315
OKC RAREP	SCATTERED TRWX FROM THE NE PART OF THE TEXAS PANHANDLE THRU NW OKLAHOMA AND INTO S CENTRAL KANSAS. MOVEMENT IS AT 30 MPH AND TO THE NE. MAX TOPS TO 62,000 FT. 140 MI WNW OF OKLAHOMA CITY, OK	2330
ICT RAREP	TRW COVERING CENTRAL KANSAS, NW OKLAHOMA, AND THE EXTREME NE SECTION OF THE TEXAS PANHANDLE. MAX TOPS TO 35,000 FT.	2330
AMA RAREP	AREA OF TRWXX EXTENDING OVER THE EXTREME NE PANHANDLE OF TEXAS, AND NW OKLAHOMA. MAX TOPS OF 60,000 FT. 100 MI NE OF AMARILLO, TX WITH MOVEMENT TO THE NE AT 30 MPH	2335
TORNADO	A TORNADO TOUCHED DOWN 7 MI W OF CANADIAN, TX TEARING THE ROOF OFF A BARN	2335
FUNNEL CLOUDS	NUMEROUS REPORTS OF FUNNEL CLOUDS IN THE VICINITY OF CANADIAN, TX	2335
HAIL	HAIL REPORTED IN THE VICINITY OF NORFOLK, NE	2355
TEMP	FT. WAYNE, IN SET A RECORD HIGH TEMP FOR THIS DATE WITH A READING OF 87°	0000
FUNNEL CLOUD	AN APPARENT FUNNEL CLOUD WAS SIGHTED 12-14 MI SW OF GAGE, OK AND MOVING TO THE NE	0006
SVR TSTM WARNING	WARNING ISSUED FOR GRAY, HEMPHILL, ROBERTS, AND WHEELER COUNTIES IN TEXAS UNTIL 8:15 P.M. CDT. AT 7:15 P.M. AMARILLO RADAR INDICATED SVR TSTMS W OF MIAMI, TX, S OF PAMPA, TX AND N OF McLEAN, TX MOVING NE BETWEEN 25-30 MPH	0015
AMA RAREP	SEVERAL SCATTERED TRWXX CELLS LOCATED OVER AN AREA FROM 5 MI SW OF GAGE, OK TO 65 MI NE OF AMARILLO, TX. NUMEROUS TOPS OVER 50,000 FT. CELL MOVEMENT IS TO THE NE AT 30 MPH	0015

TABLE 2. CONTINUED.

<u>EVENT</u>	<u>LOCATION</u>	<u>TIME (GMT)</u>
HAIL	SVR TSTM WITH 5/8 INCH HAIL AT GAGE, OK	0016
OKC RAREP	FEW TRWX COVERING NW OKLAHOMA AND THE NE PART OF THE TEXAS PANHANDLE. MAX TOP OF 65,000 FT. 137 MI WNW OF OKLAHOMA CITY, OK. ACTIVITY MOVING AT 35 MPH TO THE NE	0030
ICT RAREP	SCATTERED TRWXX INCREASING IN INTENSITY FROM EXTREME S CENTRAL NEBRASKA, CENTRAL KANSAS, AND INTO PARTS OF THE TEXAS AND OKLAHOMA PANHANDLES MOVING NNE AT 30 MPH. MAX TOPS TO 53,000 FT.	0030
SVR TSTM	REPORTED AT GAGE, OK WITH WINDS GUSTING TO 35 MPH. VISIBILITY REDUCED TO 1/4 MI	0114
SVR TSTM WARNING	ISSUED FOR HEMPHILL, LIPSCOMB, AND ROBERTS COUNTIES OF TEXAS UNTIL 9:15 P.M. CDT. AT 8:20 P.M. AMARILLO RADAR INDICATED SVR TSTMS 8 MI NW OF MIAMI, TX. MOVEMENT WAS TO THE NE BETWEEN 25-30 MPH	0120
OKC RAREP	NUMEROUS TRWX INDICATED OVER PARTS OF THE NE TEXAS PANHANDLE, EXTREME NW OKLAHOMA, AND S CENTRAL KANSAS MOVING AT 35 MPH TO THE NE WITH MAX TOPS OF 60,000 FT.	0130
HAIL	INDICATED BY OKLAHOMA CITY RADAR 132 MI NW OF OKLAHOMA CITY, OK	0130
HOOK ECHO	OKLAHOMA CITY RADAR INDICATES A HOOK ECHO 25 MI S OF GAGE, OK. MAX TOPS OF 65,000 FT. WITH A TROP AT 42,000 FT.	0130
ICT RAREP	SCATTERED TRWXX COVERING CENTRAL KANSAS, NW OKLAHOMA, AND THE NE PART OF THE TEXAS PANHANDLE. CELL MOVEMENT IS AT 35 MPH AND TO THE NNE. MAX TOP OF 57,000 FT. 12 MI WNW OF WICHITA, KS	0130
SVR TSTM	REPORTED AT GAGE, OK	0212
AMA RAREP	CATTERED TRWXX COVERING AN AREA 6 MI ON EITHER SIDE OF A LINE FROM 20 MI SSW OF GAGE, OK TO 77 MI ENE OF AMARILLO, TX MOVING AT 32 MPH TO THE ENE WITH MAX TOPS TO 56,000 FT.	0215
FUNNEL CLOUD	FUNNEL CLOUD INDICATED BY AMARILLO RADAR NEAR CANADIAN, TX	0215

TABLE 2. CONTINUED.

<u>EVENT</u>	<u>LOCATION</u>	<u>TIME (GMT)</u>
TORNADO WARNING	ISSUED FOR HEMPHILL AND LIPSCOMB COUNTIES OF TEXAS UNTIL 10:30 P.M. CDT. AT 9:10 P.M. SHERIFF REPORTED FUNNELS NEAR CANADIAN, TX MOVING TO THE NE BETWEEN 25-30 MPH	0215
FLASH FLOOD WATCH	IN EFFECT UNTIL MIDNIGHT FOR LIPSCOMB AND HEMPHILL COUNTIES OF TEXAS	0220
TURBULENCE	MODERATE TO SEVERE TURBULENCE ENCOUNTERED BY AIRCRAFT OVER GREAT BEND, KS	0258
HAIL	SVR TSTM AT GAGE, OK WITH 3/4 INCH HAILSTONES	0305
FLASH FLOOD WARNING	IN EFFECT UNTIL 1:00 A.M. CDT FOR GRAY, ARMSTRONG CARSON, AND ROBERTS COUNTIES OF TEXAS	0310
HAIL	HAIL INDICATED BY AMARILLO RADAR 102 MI NE OF AMARILLO, TX	0320
AMA RAREP	FEW TRWXX LOCATED 5 MI ON EITHER SIDE OF A LINE FROM 62 MI ENE OF AMARILLO, TX TO 35 MI ESE OF AMARILLO. CELL MOVEMENT IS AT 30 MPH TO THE NE	0320
OKC RAREP	TRWX COVERING AN AREA 25 MI ON EITHER SIDE OF A LINE FROM 45 MI SSE OF AMARILLO, TX TO 30 MI SW OF HUTCHINSON, KS. CELL MOVEMENT AT 35 MPH TO THE NE. MAX TOPS TO 62,000 FT.	0330
ICT RAREP	SCATTERED TRWXX INDICATED OVER PARTS OF S CENTRAL NEBRASKA, CENTRAL KANSAS, EXTREME NW OKLAHOMA, AND THE EXTREME NE PART OF THE TEXAS PANHANDLE. MOVEMENT IS AT 30 MPH TO THE NE WITH TOPS OVER 55,000 FT.	0330
SVR TSTM WARNING	ISSUED FOR N HEMPHILL AND LIPSCOMB COUNTIES OF TEXAS UNTIL 11:30 P.M. CDT. AT 10:25 P.M. AMARILLO RADAR INDICATED SVR TSTMS BETWEEN GLAZIER AND HIGGINS, TX. THESE STORMS WERE MOVING TO THE NE AT 30 MPH	0330
SVR TSTM WARNING	ISSUED FOR DAWSON, ANDREWS, MARTIN, MIDLAND, AND ECTOR COUNTIES OF TEXAS UNTIL 11:00 P.M. CDT. MIDLAND RADAR INDICATED A LINE OF TSTMS FROM 20 MI E OF SEMINOLE, TX TO JUST SW OF ODESSA, TX. THESE STORMS ARE MOVING TO THE EAST AT 20 MPH	0405
HAIL	PEA SIZE HAIL WAS REPORTED AT FLOYDADA, TX	0412

TABLE 2. CONTINUED.

<u>EVENT</u>	<u>LOCATION</u>	<u>TIME (GMT)</u>
AMA RAREP	5 MI WIDE LINE OF TRWXX FROM JUST E OF PLAINVIEW, TX TO JUST W OF GAGE, OK. THE LINE MOVEMENT IS 25 MPH TOWARDS THE EAST. MAX TOPS TO 51,000 FT.	0413
OKC RAREP	LINE OF TRWX EXTENDING OVER AN AREA 15 MI ON EITHER SIDE OF A LINE FROM 70 MI WNW OF PONCA CITY, OK TO 20 MI W OF GAGE, OK TO 35 MI ESE OF PLAINVIEW, TX. THE N END OF THE LINE IS MOVING AT 30 MPH TO THE NNE AND THE S END IS MOVING EASTWARD AT 30 MPH. MAX TOPS UP TO 62,000 FT.	0430
ICT RAREP	SQUALL ZONE LOCATED 30 MI WSW OF GRAND ISLAND, NE TO 20 MI NW OF TOPEKA, KS TO 35 MI WNW OF CHILDRESS, TX. AREA MOVING NNE AT 20 MPH WITH TOPS TO 61,000 FT.	0430
LBB RAREP	NUMEROUS TSTMS ALONG A LINE OVER THE SOUTHERN PART OF THE TEXAS PANHANDLE. TSTMS MOVING EASTWARD AT 30 MPH	0435
OKC RAREP	LINE OF TRW++ DECREASING IN INTENSITY. AREA EXTENDS 15 MI ON EITHER SIDE OF A LINE FROM 40 MI WSW OF WICHITA, KS TO 20 MI ENE OF GAGE, OK TO 25 MI WSW OF CHILDRESS, TX. AREA MOVEMENT IS ENE AT 35 MPH WITH TOPS TO 58,000 FT.	0530
AMA RAREP	LINE OF TRW++ DECREASING IN INTENSITY. AREA EXTENDS 12 MI ON EITHER SIDE OF A LINE FROM JUST NE OF MIDLAND, TX TO 25 MI WNW OF CHILDRESS, TX TO 30 MI NNE OF GAGE, OK TO 70 MI SE OF DODGE CITY, KS. ACTIVITY IS MOVING ESE AT 25 MPH. MAX TOPS TO 50,000 FT. 105 MI ENE OF AMARILLO, TX	0530
ICT RAREP	NUMEROUS TRWXX EXTENDING FROM CENTRAL KANSAS TO W OKLAHOMA. AREA IS MOVING NE AT 30 MPH	0530
TURBULENCE	AT 20,000 FT. AIRCRAFT ENCOUNTERED MODERATE TO SEVERE TURBULENCE	0607
OKC RAREP	NUMEROUS TRW++ OVER S CENTRAL KANSAS AND NW OKLAHOMA MOVING 35 MPH TO THE ENE. MAX TOPS TO 55,000 FT.	0630
AMA RAREP	LINE OF TRW DECREASING IN INTENSITY FROM EXTREME S CENTRAL KANSAS THRU W OKLAHOMA AND INTO W CENTRAL TEXAS. MOVEMENT IS TO THE ESE AT 30 MPH WITH TOPS UP TO 38,000 FT.	0630

TABLE 2. CONTINUED.

<u>EVENT</u>	<u>LOCATION</u>	<u>TIME (GMT)</u>
ICT RAREP	NUMEROUS TRWXX OVER CENTRAL KANSAS AND PARTS OF W OKLAHOMA. ACTIVITY IS MOVING TO THE NE AT 30 MPH	0630
ABI RAREP	LINE OF TRW++ OVER W CENTRAL TEXAS. LINE MOVING TO THE EAST AT 25 MPH	0715
OKC RAREP	FEW TRW++ OVER S CENTRAL KANSAS AND MOST OF W OKLAHOMA. THIS AREA IS MOVING AT 35 MPH TO THE ENE WITH MAX TOPS TO 50,000 FT.	0730
AMA RAREP	AREA OF SCATTERED TRW OVER EXTREME W OKLAHOMA AND PARTS OF W CENTRAL AND NW TEXAS. ACTIVITY MOVING AT 45 MPH TO THE NE	0730
ICT RAREP	AREA OF TRWX DECREASING IN INTENSITY FROM CENTRAL AND PARTS OF NE KANSAS TO EXTREME NW OKLAHOMA. INDIVIDUAL CELLS ARE MOVING TO THE NE AT 30 MPH. MAX TOPS 50,000 FT.	0730
OKC RAREP	FEW TRW+ DECREASING IN INTENSITY OVER PARTS OF S CENTRAL NEBRASKA, CENTRAL AND E KANSAS, AND PARTS OF NW OKLAHOMA. THIS AREA IS MOVING AT 35 MPH TO THE ENE WITH MAX TOPS TO 47,000 FT.	0830
ICT RAREP	NUMEROUS TRWX COVERING CENTRAL AND E CENTRAL KANSAS AND PARTS OF N CENTRAL OKLAHOMA. MOVEMENT IS TO THE NE AT 30 MPH	0830
SEP RAREP	WIDELY SCATTERED TRW OVER W CENTRAL TEXAS	0835
TURBULENCE	MODERAT TO SEVERE TURBULENCE ENCOUNTERED BY AIRCRAFT OVER WICHITA FALLS, TX	0902
OKC RAREP	FEW TRW+ OVER SE KANSAS AND CENTRAL OKLAHOMA. MAX TOPS TO 29,000 FT.	0930
ICT RAREP	TRWX REPORTED FROM EXTREME SE NEBRASKA, E CENTRAL KANSAS TO PARTS OF N CENTRAL OKLAHOMA. THIS AREA IS MOVING TO THE NE AT 30 MPH	0930
UMN RAREP	WIDELY SCATTERED TRW OVER W CENTRAL MISSOURI AND SE KANSAS. THESE STORMS ARE MOVING TO THE ESE AT 30 MPH	0933
OKC RAREP	FEW TRW+ COVERING S CENTRAL KANSAS, MOST OF OKLAHOMA, AND PARTS OF NE TEXAS. MAX TOPS TO 46,000 FT. WITH MOVEMENT TO THE NE AT 30 MPH	1030

TABLE 2. CONCLUDED.

<u>EVENT</u>	<u>LOCATION</u>	<u>TIME (GMT)</u>
ICT RAREP	NUMEROUS TRWX COVERING AN AREA FROM EXTREME SE NEBRASKA, CENTRAL AND E CENTRAL KANSAS TO PARTS OF N CENTRAL OKLAHOMA. MOVEMENT IS TO THE NE AT 30 MPH WITH TOPS UP TO 46,000 FT.	1030
MAF RAREP	LINE OF TSTMS FROM PECOS RIVER NEAR PANDALE, TX, NORTH TO 15 MI E OF BIG LAKE, TX MOVING EAST AT 30 MPH	1030
ICT RAREP	NUMEROUS TRWX FROM EASTERN THIRD OF KANSAS TO N CENTRAL OKLAHOMA WITH MAX TOPS TO 46,000 FT. ACTIVITY IS MOVING NE AT 30 MPH	1030
SEP RAREP	WIDELY SCATTERED SHOWERS OVER A 25 MI WIDE BAND FROM DURANT, OK TO WEATHERFORD, TX MOVING EAST AT 30 MPH	1035
OKC RAREP	FEW TRW++ THRU CENTRAL OKLAHOMA TO EXTREME S CENTRAL KANSAS. AREA MOVING NNE AT 25 MPH WITH TOPS TO 40,000 FT. SECOND AREA OF DECREASING TSTM ACTIVITY OVER NE TEXAS IS MOVING TO THE EAST AT 30 MPH	1130
ICT RAREP	NUMEROUS TRWXX INCREASING IN INTENSITY OVER E CENTRAL KANSAS TO N CENTRAL OKLAHOMA WITH TOPS REACHING 50,000 FT. ACTIVITY IS MOVING NE AT 30 MPH	1130
GGG RAREP	NEW AREA OF WIDELY SCATTERED SHOWERS THROUGHOUT NE TEXAS. THIS AREA IS MOVING AT 25 MPH TO THE NE	1131
SEP RAREP	SCATTERED TRW INCREASING IN INTENSITY JUST N OF DALLAS, TX AND THRU NE TEXAS MOVING AT 30 MPH	1135

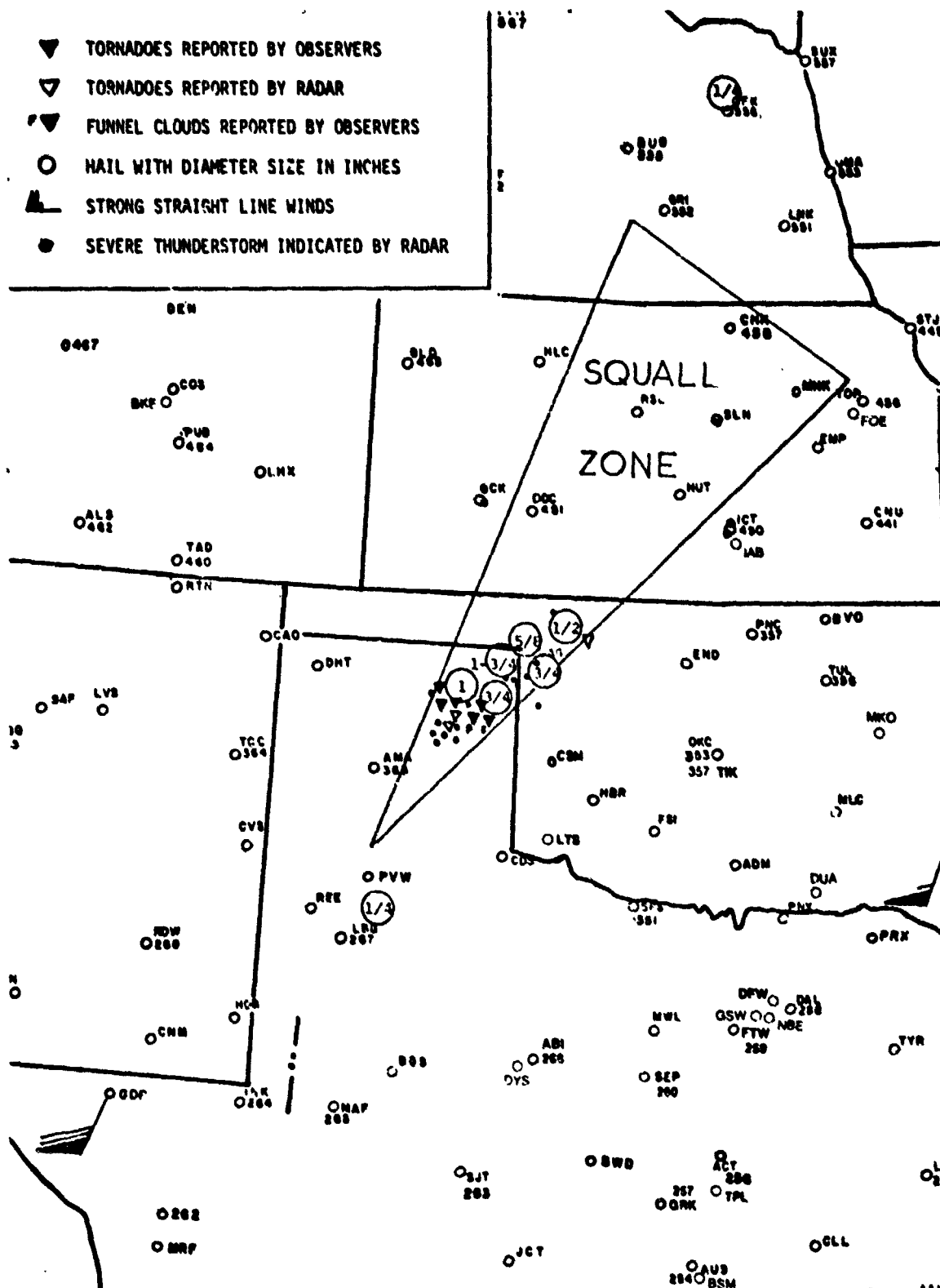


Fig. 49. Severe weather reports between 1200 GMT 9 May and 1200 GMT 10 May 1979 in the AVE-SESAME IV area.

REFERENCES


Alberty, R. L., D. W. Burgess, C. E. Hane, and J. F. Weaver, 1979:
SESAME 1979 Operations Summary. U. S. Department of Commerce,
Boulder, 253 pp.


APPROVAL

A PRELIMINARY LOOK AT AVE-SESAME IV CONDUCTED
ON 9-10 MAY 1979

By Michael J. July and Robert E. Turner

The information in this report has been reviewed for technical content. Review of any information concerning Department of Defense or nuclear energy activities or programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.


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